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Exhibit Highlight: 3330 Replacement

1971 SJCC Opens in a 'Concerned' Atmosphere

Old and new, side by side, comprise Atlantic City's Convention Hall, site of this week's Spring Joint Computer Conference, which is expected to draw up to 30,000 computer specialists and users. Floor space was more than doubled, as a result of addition to left. With "mirror image" expansion of convention center in Las Vegas, and utilization of Houston's "Astrodomain," the joint conferences now have suitable single-level sites across the country.

By Edward J. Bride
CW Staff Writer

ATLANTIC CITY, N.J. – In the days when computer technology was advancing so fast you couldn't recognize equipment shown at a Fall Joint Computer Conference from that of the previous Spring Joint . . . back when money was plentiful and a bad idea sometimes "sold" better than a good one . . . the "joints" were the major showcase for the latest hardware and software developments.

Things have changed now. Most of the leading computer manufacturers aren't here this spring, but the more things change, the more they stay the same.

The industry and the users have both matured, both seek improvements to existing systems and still exchange what they feel are the latest ideas on technology, applications and implications.

The new announcements appear to be coming in the peripheral or replacement areas, not in mainframes; but the kitchen of computer competition is still hot.

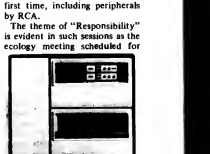
If you haven't seen the IBM 3330 disk drive yet, you won't see one at the Spring Joint Computer Conference this week, either.

But you will be able to see an independently supplied plug-to-plug replacement for the new 3330 disk system . . . except it won't have the "plug." While IBM has not yet released the specs for the 3330's controller, Century Data's 230, scheduled for introduction here, is just waiting for those specs, in order to be completely IBM-compatible.

The electromechanical portion, the trickiest part to build, is available for viewing.

While there are few new announcements anticipated for the joint, some of the equipment is being shown in public for the first time, including peripherals by RCA.

The theme of "Responsibility" is evident in such sessions as the ecology meeting scheduled for



Century Data 230

tonight, the luncheon address by Sen. Sam J. Ervin tomorrow, and the five "open forum" sessions being conducted by the activist Computer People for Peace (CPP).

A combination of responsibility and innovation will take place Thursday when the problem of unemployment is examined from several different viewpoints.

First, CPP will hold a morning meeting featuring "unemployed members of the computer community."

An afternoon session by the sponsor of the joint computer

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50% From Rural Areas

Nasu Appeals to System/3 Users

By Phyllis Huggins
CW West Coast Bureau

CANOGA PARK, Calif. – To date the newly formed National Association of System/3 Users (Nasu) has heard from nearly 500 users who indicated interest in joining the organization since an article on the group appeared in *Computerworld*, April 21.

Almost all independent suppliers for the system have written Nasu offering full cooperation and approving of the open door policy for vendors other than IBM. As one vendor put it, "Where have you been all our life?"

Users have also approved of Nasu's policies. A typical user wrote in: "This being our first venture into the field of EDP, we are at the mercy of IBM and this is a situation which I would like to correct immediately."

Another wrote: "Your group sounds too good to be true but it has as its goal exactly what we at our company are trying to accomplish – independent peripherals for our system; idea sharings especially on problem areas; and getting to know the system completely."

Users Categorized

A breakdown by President Irwin Cohan of the 500 Nasu respondents shows how System/3 users compare by industry category with users of larger systems. According to two recently published DP industry surveys cited by Cohan, 40.9% of large users are in the manufacturing field. Forty-five and one-tenth percent of System/3s installed or on order are in this category. The higher percentage for S/3 is believed due in part to the large number of 360/20s that are being replaced by S/3, said Cohan.

Banks and financial users account for 9.6% of larger users and only 4.2% of S/3s. This is attributed to the needs these organizations have for more powerful equipment.

It is expected that with the recent announcement of more core, disk storage and increased printer speed for the 3s, this percentage will increase, he said.

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DPMA Eliminates Degree for CDP

CW Midwest Bureau

PARK RIDGE, Ill. – The Certification Council of the Data Processing Management Association (DPMA) has abolished academic requirements for the Certificate in Data Processing (CDP) but increased work experience requirements from three to five years.

The decision of the council is an about-face from the thinking it demonstrated two years ago when it set a Bachelor's of Arts Degree requirement for the February 1972 examination.

The action, according to DPMA, was taken at the council's spring meeting and will take effect with the 10th annual exam in 1972.

The council said that significant changes in society, particularly in the educational segment, influenced the decision.

College curricula, the council said, grading practices and the very nature of a degree itself have undergone serious transformation.

It added that the "open society" . . . the concept that provides economic opportunity for people regardless of educational attainments . . . is showing that a person should be judged on deeds rather than degrees.

The council said that very valuable elements learned in the field, such as the abilities to communicate and manage people effectively cannot be measured by the possession of a college degree. It cited this as part of the reasoning behind the increase in work experience requirements saying that it felt the CDP exam requires a broad knowledge base and it made no difference how or where that base is required.

The council said that the elimination of the academic requirements will expedite the establishment of certification programs in foreign countries where the degree requirement was becoming a stumbling block.

Originally, DPMA said, the CDP exam had no academic requirements. These were subsequently changed from credit for courses in college EDP to two years of college credits to the degree.

DP Brings It Home

An A6A Navy attack-bomber, returning to the deck of the USS America, the data center at sea, is actually a flying terminal, complete with minicomputer. Story on Page 2. (CW Photo by Thomas J. Morton).

On the Inside

A DP Center at Sea— Not Typical Operation

ABOARD THE USS AMERICA, Somewhere in the Caribbean – To those who might feel that one DP operation might end up like all the rest, it would be easy to recommend a day in an aircraft carrier center at sea. While the operation might appear similar and some of the problems might seem familiar, some of the solutions and a lot of the problems are not routine.

For example, how about a computer center's floor tilting one way or the other several times a day? Sometimes up to an excess of 10 degrees? Or raining, then falling with a thud, sometimes 35 feet?

The supply center 1218 Univac computer, one of four CPUs aboard the America.

That's a DP center at sea.

Aboard the carrier there are four DP centers – the center in Sins (ship's inertial navigation system); another in CIC (combat information center); IOIC (intelligence operations information center) has still another, and Division Seven (supply) has the fourth. Division Seven is most like the normal business data center in type of operation.

A Navy ship as big as the America has many divisions. There are seven supply divisions alone. A ship, in analogy, is divided into separate functions as is a corporation. On the America, there is an executive division; air group, the division which operates the ship and repairs it; a communications division, and many, many others.

One of the seven supply divisions is data processing. S-7, in Navy jargon, is the business operation of that ship, at sea or ashore. Its two prime responsibilities are supply processing for all divisions on the ship and an aviation maintenance management system.

Speaking of the aviation system, Lt. Stephen Healy, the DP division officer, said that it was broken into five areas – manhour accounting, parts usage, airplane usage, aircraft and aircraft engine use, and an analyzation, by trend monthly, on the ship's readiness relating to the status of the country's defense.

On a daily basis, S-7 runs a status report on aircraft for the squadrons aboard the carrier to allow the squadron operations officers to know all there is to know about their aircraft.

The supply system, according to Healy, has 10 basic programs to run. The system, called the uniform carrier supply control system, is, Healy said, "the data processing center for all the hardware on the ship and on the airplanes . . . . all the hardware and all the consumables."

The system consists of running an inventory flow program, an inventory accounting program and a budget performance program for all the departments of all the divisions.

The S-7 center runs 24 hours per day, Healy said, so the complexities of multiprogramming systems didn't present any unusual problems.

Nor do repairs on equipment that goes down. True advocates of "If it's 1-0," S-7 has IBM keypunches, Univac tape drives, a Navy-designed card reader-sorter and a Univac 1218.

These articles on a DP center at sea were written by Thomas J. Morton of the CW Midwest Bureau.

At sea, according to the sailors, there are some unique problems. The roll and pitch of the ship under way makes disk operation impractical.

"Every now and then," one DP sailor said, "everything goes. The sea's high, the ship's pouring on power to get wind across the flight deck, and they're recovering aircraft. That's when we have tape runaways."

To that sailor, the recovery is simple. "We run the whole deck again," he said, "because what happens is that the tape runs through the head too fast . . . like at the inter-record space . . . and things get all fouled up. We consider ourselves lucky if the tape breaks, because then we know right away that something is wrong. Sometimes we get into the run before we find out there's a snafu, but that just takes us longer. We have to correct our log before we're able to sign out."

Univac 1240 tape drives use mechanical tension arms to attempt to offset the play in tape caused by the rolling or the pitching of the ship. (CW Photos by Stan Sabik)

Radio Signal, Conversion

Sailor Gets Input in Odd Ways

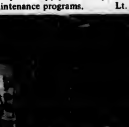
ABOARD THE USS AMERICA – The DP sailor is a professional in every sense of the term. He is probably better trained than his civilian counterpart, a differently motivated individual, and a man whose bosses demand much more than just acceptable DP operations. It appears this applies to both the officers and the enlisted men.

Life in DP is different. The majority of Naval DP input is obtained electronically. The input source could be in an aircraft miles from the ship and returned to the ship by radio. It could be from a ship's radar installations. It could be a direct, radio-transmitted digital data link or a conversion from an analog computation.

While the traditional punched card operation exists aboard a Navy ship of the line, even that varies somewhat from the traditional.

The electronic input operations and the analog conversion operations, though important to the ship's performance and functions, are both dedicated applications and in some cases highly classified.

Most of the "business operations" are in the traditional punched card operational format. They are supply inventory and maintenance programs.



An electronics technician's mate adjusts the analog equipment which feeds digitized data to a 1230 for analyzation of an aircraft's landing for SPN-10 and SPN-42.

While punched card equipment and keypunch operators are both at work in the America's Supply Corps Data Center, not all of the card punch is prepared by persons from that center.

Since the center serves all departments on the ship, men from those departments serve their own units in the preparation of input for the programs.

These sailors, the beginners in Navy DP, weren't just assigned to DP by the Navy. According to Lt. Stephen Healy, the DP officer, the men had had to demonstrate both a high degree of interest in data processing and some experience in it to be sent to DP schools after the completion of their Navy "boot camp."

Healy explained that the DP sailor's training is a 12-week course in keypunching, computer operation and "some basic computer theory." His training continues "on the job" with the higher rates "really making him learn as they give him more complex assignments."

"After he's had some fleet experience," Healy said, "he can qualify for C school." There the sailor learns his programming skills and returns to the fleet as a DP technician.

The officers, according to a Naval commander, receive their DP training in theory and in center management.

Does the DP sailor, officer or enlisted man, think the civilian world of DP has a market for his skills? Not really.

"I thought so once," one sailor said, "and I tried to get a job on the beach after my second hitch was up. I don't think the people believed me . . . they thought I was a 'jack of all trades and a master of none.' They wanted me to start in keypunch, and I'd had seven years experience in the fleet."

"Another thing," said Danny D. Bouchard, a petty officer second class, "is that we do things differently out here. Information comes in to data processing in a whole lot of different ways. How many centers ashore get their total input transaction from a radio signal and conversion? Not many.

Indifferent Copilot Brings Perfect Landing

ABOARD THE USS AMERICA – Coming out of the sky at 170 knots at a rolling, pitching ship is just one of the problems facing a naval or marine aviator attempting a carrier landing. Another is the "hurble," a pocket of turbulence created by the ship moving, too, through the air. Both of these problems and one the pilots don't like to think about, are being solved by a computer.

"Just about any rational human being," said Cmdr. Kenneth Russell, the "skipper" of Navy Attack Squadron 35, "can be taught to fly an airplane. To fly an airplane off a carrier? Now that's something else again.

"But we're not talking about Navy air, we're talking about that computer setup. Man! That thing is really something else!"

"That thing" is AN/SPN-42, the Navy's Automated Carrier Landing System (ACLS).

With it, a computer aboard a carrier can "lock on" a plane approaching the carrier, guide it down a glide path, and "hook-on" to the third cable of the four in the arresting gear for what the pilots call "the perfect landing."

Russell, a pilot himself and "a portion of the team of engineers and aviators who developed system . . . a very small portion," said that AN/SPN-42 will bring the plane to the third cable "99 times out of 100."

Analog computers develop what the pilots call the window, an imaginary area behind the carrier where "the perfect" glide path lies for an approaching aircraft. Radar homes in on the approaching plane, pinpointing its exact position behind the ship. Radar also indicates the speed of the approaching plane and its angle of attack (the angle of the plane in relation to the deck and the flow of air about its own fuslage).

Data from radar is fed to a digital computer through a transponder, as is the window's data from the analog devices. The digital computer analyzes the aircraft flight as it approaches the deck in relation to the perfect glide path in the window.

As deviations are found, the digital computer suggests corrections for the aircraft which are relayed to the aircraft itself via a transponder and radio signals.

In the aircraft, really a flying terminal, a transponder there takes the radio signals and converts them to input for a minicomputer within the airplane to make corrections with the aircraft's airfoil surfaces.

"Now," said Lt. Tom Connelly, a pilot in Attack 35, "that computer doesn't mess around. When it says it should have a correction, it makes that correction. Wham! It cares not a little that there is a guy in that airplane who is wondering why his airplane seems to be going crazy. But that thing will bring you down to that third cable everytime . . . with the pilot not touching a thing."

In Carrier Air Traffic Control Center (CATC), a controller watches a CRT connected to the computer (a Univac 1230) running the whole show.

It is that controller's decision, made in conjunction with the pilot approaching the ship, that activates the AN/SPN-42 system. The controller watches a "blip" superimposed on a screen portraying the perfect glide path . . . which is being calculated by the SPN-42 system. At seven miles out behind the carrier, the controller, with the pilot, locks on to the system with the flick of buttons. From then on, the system brings the aircraft to the deck.

GE T/S Net Reaches 250 Cities in UK, North America

By Ronald A. Frank
CW Technical News Editor

NEW YORK – The GE time-sharing network has been expanded to provide increased capabilities to users. Users can now access the system with a local phone call in 250 cities in North America and Great Britain.

GE outlined the features of the expanded network at a briefing session for industry experts held here last week. According to Paul Sage, manager of information services marketing, GE intends to establish a complementary relationship with users' in-house installations to provide "main line" EDP tools.

The GE network also includes features to insure the privacy of users' data and provide "absolute isolation" from power reductions or failures.

The GE transatlantic link, which allows British users to access one of three processing "supercenters" in Cleveland, is already operating at 50% capacity using a satellite channel leased from Comsat.

The network may be expanded still further to provide increased service soon into western Europe and lease a second Comsat channel, a GE source told CW.

GE has apparently placed strong emphasis on security at the supercenter. Each windowless site includes 24-hour guard protection and absolutely no visitors are allowed inside, according to Dr. George Feeney, information network manager. GE has retained a security consultant on a continuing basis to evaluate the procedures. For power protection each center will operate from 35 tons of batteries which are automatically charged from diesel generators when normal power sources are interrupted.

'Independent Run'

Designed primarily to handle such user applications as order entry, product design, inventory control, etc., the GE service has an "independent run" capability to allow users to enter a job into the network and disconnect their terminal for other work while waiting for the results. Users can thus have several jobs running concurrently at the processing centers accessed through one user terminal.

An "immediate run" feature will cause a predetermined program to be executed immediately after log-in. This enables users to identify further and control access to the GE network beyond the required password, GE said.

Another capability, interprocessing [CW, April 21], will add a special teleprocessing terminal at user installations for direct I/O of data from customer site into the network.

At present, interprocessing service allows a manually initiated tape transmission link between user and processing center. The direct input capability through the terminal is scheduled for early 1972, GE said.

The GE service has also included a 60% increase in core capacity to give each user 64K bytes of available storage, a Fortran IV compiler has been added and an interactive Cobol capability is currently under development.

A remote media service provides users with "second day delivery" of card and tape records to and from processing centers.

The GE network uses 600 Series central processors with Gepac 4020 front-end processors connected via remote concentrators and multiplexers to user terminals.

The other supercenters are in Los Angeles and Teaneck, N.J.

UCLA Cuts Back University Use Of DP Facility

By Phyllis Huggins
CW West Coast Bureau

LOS ANGELES – The University of California at Los Angeles has severely curtailed the use of its computer center because of budget problems.

As of May 10 the campus computer network announced that except for classroom use all university users were under a freeze. This does not apply to government or industry-funded research projects but only to those supported by the university.

According to William B. Kehl, director of the Campus Computer Network, if the freeze had not been put into effect, the center would have run out of money by May 20, and the next fiscal year doesn't start until July 1. An emergency category has been established that applies to graduate work where computer effort is needed to apply for federal grants. For what funds remain a priority list has been established.

First on the priority list are classroom use. Others are, in order: graduate students working on their doctoral; master's students working on their theses; nongraduate student work; and faculty research. These groups will have to reapply for time on the computer and will be accepted on a priority basis.

"It's an Alice in Wonderland accounting system," claimed Prof. E.R. McLean, director of the graduate business administration computing services. "The university isn't going to save any money by curtailing use. The equipment has to be paid for regardless of how much it is used; the staff is being kept the same; the lights are on all the time. The only added cost of use by university people is cards and papers and other such incidentals."

UCLA operates an IBM 360/94 on a purchase agreement that has to be paid off in several years no matter how much use the computer gets.

There are two critical factors that have gotten university centers into this type of bind, according to McLean.

One is the U.S. Government which insists it be given the cheapest rate. This means that if a university estimates its computer costs will average $400 an hour, the government is charged this, but this is the minimum for everyone else. If the university were to give excess time to users at a lower rate, the government could then claim a rebate.

McLean estimates that if only government-funded work were done at UCLA, the computer would sit idle for 90% of the time. Even so, he says, this resource is used only 40% of the time.

UCLA and other university centers face increasing problems as the National Science Foundation has greatly cut back its support of centers and IBM grants are expected to run out in 1972, but the payment for the computer centers has to go on.

Antitrust Suit Claims IBM Policy Change Illegal, Free DP Measurement Charged

CW West Coast Bureau

SANTA CLARA, Calif. – A local firm, claiming IBM has illegally changed policies and now gives free use of its Systems Measurement Instrument (SMI), has filed a $15 million antitrust suit against the industry giant to force a return to the price tag.

The suit is tied to a recent internal announcement by IBM that SMI, a hardware-software device to measure computer performance, is no longer available to users but could be used by company personnel to support sales efforts.

The suit was filed May 13 by Computer Synectics Inc. (CSI), whose president, Dudley Warner, helped design IBM's SMI before forming his own company about two years ago. The principal product of the plaintiff is a Systems Utilization Monitor (SUM), a direct competitor with SMI.

Under the new IBM policy, which became effective May 3 a spokesman stated, detailed reports "may not be given to customers." Information obtained from measurement tests is "abstracted and summarized" in customer proposals, and may be used in supporting these proposals, the IBM official noted.

SMI, which formerly carried a price tag of $1,800 per CPU, is comprised of a monitor, power unit and write-only tape unit. It is used to test circuits, after which a "confidential" IBM data reduction program is used to generate measurement reports.

As an example of how his SUM could be used in competition with IBM's measurement package, the CSI official cited Trans World Airlines, which returned $600,000 of IBM gear, he stated, after using SUM and finding its own configuration inefficient.

The suit seeks treble the "actual" damages of $5 million in loss of customers, plus an injunction against further IBM offering of "monitoring or measuring services under present conditions."

The action was filed in San Francisco, in U.S. District Court, Northern District of California. IBM said it could not comment on the suit directly "until we see the actual claim" filed by CSI.

Responsibility, Innovation Prevail at SJCC

(Continued from Page 1)

conferences, the American Federation of Information Processing Societies (Afips), will look at the same problem from management's viewpoint in a session entitled "the changing job market."

Finally, in a late addition to the program, Afips will conduct a seminar, open to the public, on how to go about finding jobs under current conditions.

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The one-hour session is slated for the ballroom at 5 p.m. immediately after the exhibit area has closed. Panelists will discuss preparation of resumes, how to be interviewed and other such topics pertinent to unemployed computer people who have never faced this situation.

All conference-goers, including the exhibit-only attendees, will get to see the two art exhibits, one in each "lounge" area towards the center of each hall. About 50 "paintings" were scheduled to be on display.

One of the more controversial sessions is likely to be conducted by CPP whose Wednesday afternoon session ("computers and the military") is supposed to disclose the principles and actual uses of the "electronic battlefield."

CPP will set the stage for the 2 p.m. meeting with an outdoor peace rally on the Boardwalk outside Convention Hall. Ann Rosenburg, press coordinator for the group, said the mayor of Atlantic City has issued a permit for the gathering. She told CW her group was hoping for 800 to 1,000 persons to attend.

Previous Products Prevail

An exception to the "previously shown product prevalence" is Hewlett-Packard, which planned an "unveiling" for Monday. The company's new Model 2100A minicomputer is offered at a lower price while maintaining compatibility with its predecessors – the 2114, -15 and -16.

A 1,600 bit/in. tape drive and a disk cartridge unit, which also includes a fixed disk, are also being offered to HP OEM and end users.

The Century disk unit, slated for demonstration in an off-line mode, shows such features and operating characteristics as head positioning.

The Model 230 has doubled both the existing tracks and storage density of the IBM 2319, as does the new IBM 3330.

The actual number of exhibitors was fluctuating right through last week, and probably won't be known until the doors are closed behind the last visitor. The latest count was 194, occupying between 595 and 600 booths.

Should this represents a sizeable drop from the recent past, preregistrations were at a new high: 2,143 paid. Afips said last week it was "optimistic" about the final numbers, but would not offer an estimate, other than the 30,000 round figure that has been used over the past few years.

Most S/3 Users in Manufacturing

(Continued from Page 1)

A whole new market for computers has been tapped in the field of wholesalers. S/3s show 110% higher utilization here, from 6.7% for other systems to 14.2%. Retail firms compare 2.2% to 3.3%.

In local government S/3 use is below other systems with only 4.8% compared to 6.8%. This indicates that the market for small computers in local government is just beginning to open up, according to Cohan.

Hospitals have only 1.4% of S/3 users compared to 3.8% of larger systems. The hospital field has been slow in adapting to EDP and this is seen as another very large untapped market resource, he believes.

Service firms show 70% higher utilization for S/3 from 9.5% to 16.1% for other users.

Transportation also jumped from 1.2% of other systems to 3.1%. Insurance companies represented only .8% of users and utilities and communication only .9%.

Other statistics reported by Nasu are that 24% of the 500 responding were using or planning to use System/3 Model 6s and 25% of those using Model 8s were disk systems.

Nineteen percent of the installations do not have a DP manager as such but have some other company officer such as the controller or treasurer serving in this function. Of all those contacting Nasu 50% are from rural areas.

Nasu is a nonprofit organization formed as a cooperative aid for System/3 users. Annual dues are $30. Information may be obtained by writing to Nasu, 2331 Vanowen St., Canoga Park, Calif., 91304.

News Wrapup

DPer Named in Bank 'Secrets' Suit

BATON ROUGE, La. – A designer of a bank's "clearing house" software package has been accused of "appropriation of a trade secret" by quitting one bank, going to work for another, and allegedly taking the program with him.

The Capital Bank & Trust Co. has filed a $5 million damage suit in federal court here against its former employee Wesley D. Hudgens, and his next employer, the Garden National Bank of Garden City, Kan.

The suit alleges Hudgens, over a period of years, was sent to various DP schools and seminars, along with other bankers who were trained to become programmers, with a long-range intent of developing and marketing the "Clearing House System."

Attorney W.C. Kaufman, representing Capital, said the plaintiff was not seeking an injunction, but only to recover "a fair estimate" of the alleged loss of exclusivity of the package, which is now "widely disseminated," he claimed.

The suit also seeks to force Garden to return the magnetic tapes, cards, and "other enrichments" that may have been developed as a result of the alleged trade secret appropriation.

Garden officials were not available, but attorney Dale Corley said he was preparing a motion for dismissal, based on his contention that the court "does not have jurisdiction in Kansas." He claimed the $5 million figure was "ridiculous," that Hudgens was not privy to reveal, "nor did he reveal," any trade secrets to the Garden Bank.

Hudgens resigned about six weeks before the suit was filed, to take a job with another bank in Louisiana, according to his wife, who was uncertain whether the job offer was still in effect.

Directory Lists Over 1,200 User Group Programs

NEW YORK – A directory of over 1,200 programs available at generally nominal fees from computer users groups has been compiled by the Association for Computing Machinery (ACM) and the Joint User Group (JUG). The *Computer Programs Directory* lists the offerings of 12 user groups that are now available to users in other groups.

Some of the programs are also available to the general public.

Documentation for all the programs is available, though actual machine-readable sources are not, according to a spokesman for CCM Information Corp., publisher of the directory.

It includes offerings from the following 12 JUG members: Decus, Common, XDS, Vim, Cube, Cosmic, AIN, Focus, RCA, CUA, Share, and Guide. The volume costs $25, hardbound, and is available from CCM Information Corp., 866 Third Ave., New York 10222.

Census Tapes May Cause Redistricting Delay

NEW YORK – Acknowledged "inconsistencies" in computer tapes provided New York by the Census Bureau may delay the state's congressional redistricting. Twelve counties containing 12.4 million people, about 65% of the state's population, are involved.

Gov. Nelson Rockefeller and the legislature had originally planned a special legislative session later this year, but the reapportionment may be handled in next year's regular session, if the differences are not resolved in time.

Javits Cites Need for Health Data Privacy

PRINCETON, N.J. – "Extensive precaution" to guard against computer errors in health care was urged by Sen. Jacob Javits at a Princeton University Conference on "The Computer in Health Care." The "unauthorized disclosure of information" from data banks could "result in the destruction of confidentiality," he said.

It is the responsibility of computer systems designers to assure security, Javits says, since society has mixed attitudes towards "illness or any aberration from what it considers normal," noted Dr. Leonard Cronkhite of Harvard.

DP Doing Your Work? How About Short Week?

OTTAWA, Ont. – The full application of science and technology could "put a lot of people out of work" in the health and education fields, but a shorter work week could solve such a problem, according to a Canadian scientist.

Dr. O.M. Solandt, chairman of the Science Council of Canada, said computer telecommunications usage could put nearly all university professors out of work, but this would happen "much more slowly than is technically possible" as social inertia and resistance would delay such a change.

Centralization Halts Florida License Thefts

TALLAHASSEE, Fla. – Thefts of blank drivers' licenses, averaging 1,000 for each of the past few years, have been reduced to zero, thanks to a computerized, centralized issuing procedure.

Blank licenses used to be stored in county courthouses, where the 45,000 thefts occurred over the last five years.

Wayward Luggage Gets Its Own Data Bank

RENO, Nev. – Frank Bender became annoyed when his valises kept vanishing at the airport. So he decided to do something about bungled baggage. He created International Luggage Registry, a data bank designed to keep tabs on galloping Gladstones. For $5 an ILR member gets special tags to paste on his luggage, and registration with ILR central in Reno, Nevada. If a trunk manages to travel where its owner isn't, a toll-free call to the computer clears it up.

Frank Bender is one of those people who, confronted with a problem, come to grips with it.

Get to know our family.

One member has keystations for under $100 a month. Another gives you a complete system for under $1000 a month.

With the KEY-EDIT 100/85 your total monthly cost-per-key-station can be under $100 a month. This is the lowest cost-per-keystation of any key-punch or key-to-tape replacement system available to the high-volume input user today.

Here's the original member of the KEY-EDIT family. The one that reduces data preparation problems to an absolute minimum. It's completely flexible as to applications and price. And the newly-designed data stations, optional configurations, model colors, and powerful new Editing software.

This is a high-performance communications oriented data input system, with powerful editing and control processing capability. Even with a wide range of peripheral equipment to choose from, you can have this system for under $1000 per month!

The KEY-EDIT Series 100 Family of data preparation systems gives users a wide range of capabilities to meet the demanding requirements of modern computer operations. Systems features within the family allow the KEY-EDIT user to grow to larger models quickly and easily with no operating changes. But KEY-EDIT users get more than a system.

They get a concept which is working now for governments, business, and industry around the world. And KEY-EDIT is backed by reliable service, reliable delivery and reliable people in major cities from coast-to-coast.

Contact them. They'll show you how KEY-EDIT can work best for you.

The KEY-EDIT 100/145 for communications and remote editing.

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MONTREAL, OTTAWA, HALIFAX, WINNIPEG, VANCOUVER, FRANKFURT AND MUNICH, W. GERMANY

On-Line System

University Aids State in Bill Drafting

LINCOLN, Neb. – Nebraska, the only state with a unicameral legislature, has continued to realize economy in the operation of state government by combining forces with the University of Nebraska's Computing Center to provide on-line bill drafting during the first session of its 82nd Legislature.

The design of the Bill Drafting System was built around an already existing remote operating system, Nuros, (Nebraska University Remote Operating System). This philosophy permitted the university to continue its normal university processing while the Bill Drafting System was in operation.

The bill drafting process permits typists at the state capitol to enter the text of the bill along with formatting instructions from eight Computer Optics CRTs. The information is transmitted to Nuros over standard leased lines. The University Computing Center has an IBM 360/65 with one million bytes of fast core and an additional one million bytes of Ampex bulk storage. Three IBM 2314s and a data cell make up the major peripheral storage.

The formatting instructions, along with the surrounding text, are read by the Legiform program and stylized outputs produced. Because the existing laws are currently located in random access storage, amendments can be handled by bringing old laws to the screen and making the appropriate modifications.

It is possible to call for printing with any one of three formats:

- Standard Printing – On amendments the old sections are brought to the screen and copied. The material to be deleted is set to be struck (overprinted with hyphens) and new material is inserted and set to be underlined. The lines on each page are numbered and printed with double spacing, and a title page is printed in Standard format.
- Engrossed Printing – The material set to be struck does not appear, and the new material is inserted without underlining. The lines are not numbered but are double spaced and the lead page is printed in Engrossed format.
- Slip Printing – The lead page is printed in Slip format and the text is single spaced without line numbering. Otherwise, the content is the same as the Standard printing.

A Society Socially Concerned

CW West Coast Bureau

LOS ANGELES – A professional society has taken positive steps to get involved in social and environmental problems. Systems Management Association's (SMA) Los Angeles chapter has distributed to local and state government officials recommendations to ease the automobile traffic and the smog problem.

Prepared by Phil Ashebraner, of the chapter, a news release and full report recommend a computerized system to provide central information on all transit routes for those wanting to use public conveyances. The report urges that it also serve as a "matching" system for those seeking car pools.

As a further inducement to share rides, the report recommends that one lane of the freeways be reserved during rush hours for those buses and automobiles with more than one passenger. Statistics show that at present cars on the freeways contain only 1.2 passengers.

To facilitate the plan, the chapter also proposes that in the suburbs "Park-Ride" areas be set aside by freeways for express bus stops and car pool pickup points.

Computer studies into the feasibility of dedicated freeway lanes have been made for the U.S. Department of Transportation by researchers with the University of California and a consulting firm. SMA urges that the plan be adopted within a year.

DP Centralization Bill Tries Again In California

CW West Coast Bureau

SACRAMENTO, Calif. – The State of California has proposed sweeping changes in its DP operations under a bill sponsored by Sen. Stephen P. Teale (D.-West Point) which would centralize all computer responsibility under a department of data processing. The bill has passed its first hurdle, being approved by the Senate Governmental Organization Committee and is now before the Senate Finance Committee.

Next step is the floor of the Senate with the final move to the Assembly floor.

Last year a similar bill by Teale was nearly approved for legislation by the Assembly, but was buried in the hectic closing days of the session. Teale's bill this year is given a 50% chance of acceptance.

In a parallel move, assemblyman Kenneth Macdonald has entered an identical bill in the Assembly.

The target is the $83 million the state spends for data processing, exclusive of the University of California and the state colleges.

This is a budget rise from $62.5 million three years ago although the number of installations has actually been reduced from 48 to 47, Teale's bill is based on a study by H. Allen Post, the legislature analyst. Post, appointed by the legislature, is independent of any governmental departments or agencies and serves as fiscal watchdog. He charged that although the Reagan administration with its Office of Management Services [CW, April 21] has halted proliferation of computers, it has not sufficiently standardized or consolidated DP centers nor has it halted rising costs.

Under the centralized plan time-sharing would come into greater play. There would also be standardization of languages.

There's Still Some DP Style in the Bank President

By Michael Merritt
CW Staff Writer

BOSTON – "The secret is making sure to help someone to be successful. Then he is grateful. Obviously it's not very hard to sell him."

That's the president of a bank talking. What's more, he became president by way of the DP department.

He's talking about the use of modern msnagement and information processing techniques – simulation models, performance measurement, long-range planning, management by objective, computer-aided stuff – techniques he has advocated and nurtured for the last eight years at State Street Bank & Trust Co.

And if he sounds a little like an IBM salesman – he was one for

George B. Rockwell of the State Street Bank & Trust 12 years.

George B. Rockwell's journey from peddling computers to running a major, old-line Boston bank may be unusual – perhaps unique – but in a way it is representative of a major shift in management style of the American corporation, Rockwell's success symbolizes the growing acceptance of rationalized management techniques in the style of Tex Thornton, Robert McNamara, the Harvard Business School, and – perhaps their most effective promoter – IBM.

State Street was one of Rockwell's accounts as an IBM salesman. Tired of roaming the country, he accepted the bank's offer to become vice-president for data processing.

His skills as a manager, helping people to be successful, brought him to the presidency of the bank last year, when he was 45. He was also recently named chief executive officer.

Rockwell's data processing-Harvsrd Business School (he attended the Advanced Management Program) background shows in his management style.

Budgets, for example. When the 12 division managers, working with their subordinates, prepare budget estimates, they use CRT terminals to communicate with a simulation model of the bank in a real-time mode. They can emulate their operation

DP Profile

statements and balance sheets, and freely manipulate variables to obtain an optimum plan for the year.

"Data processing simply allows the mnager to check and evaluate alternatives," Rockwell told CW.

"If a manager has the proper tools, if he can see how much people are changing, he can decide how to use his resources to best nstisfy customer needs."

Data processing is actually just an enabling tool for Rockwell's other management techniques. The main philosophy is management by objective.

Rockwell likes to describe this by an analogy to golfing. "If someone can lower his handicap from 40 to 30, he feels pretty good about it. If he can lower his score from 75 to 74, he feels pretty good, too. What we do is set a reasonable yet challenging goal for a man to measure himself against."

Based on previous experience at the bank, and the achievements of competitors, managers each year set performance goals for themselves in cooperation with their department heads. People who exceed the goals are rewarded both psychologically and materially.

State Street's experience is that workers appreciate knowing what is expected of them, and enjoy being challenged. Rockwell says there has been almost no resentment of this system.

All this, however, requires quantification, 'which is one place data processing becomes necessary. The long-range forecasts, the constant measurement, even the formulation of objectives, would not be possible without computers to do the busy work.

As it is, Rockwell contends, closely supervised operations actually free managers. "There's not so much time spent on pencil pushing," he noted. "There is more time for creative management.

Going back to the budget example, managers at State Street actually prepare three budgets for the year, one for what seems the most probable course of events for the coming year, one for dissster, and one for the realization of heaven on earth.

The probabilities assigned by the various managers to outside circumstances are pooled when the budgets are submitted, to derive an overall feeling of expectations – and then the budgets are revised again on the basis of the consensus.

The multiple plans enable the bank to react swiftly to changing influences, and the pooled probabilities bring a wide range of perception to a difficult problem in quantification.

All this entails many calculations though that it would be impossible without computers.

Rockwell admits that banking is particularly amenable to his management style, since so much of the business deals with already quantified variables, i.e. dollars.

The president contends, however, that the basic ideas behind rationalized management are applicable to almost any endeavor.

"I'm not saying that it is wrong for a manager to fly by the seat of his pants, if it works for him, that's fine. But I think the trend is to more formalized, sophisticated management. It has greater impact in the long term."

As for the DP department in which he got his start, Rockwell says he sees only management summaries, and has no say in operational decisions. The reason? Smiling, he says, "I'm technologically obsolete."

Dartmouth Problems

Hardware Mixing Can Be Painful

By Dick and Linda Fritz
Special to Computerworld

HANOVER, N.H. – Successful hardware mixes are possible for non-IBM mainframe users. But as Dartmouth's Kiewit Computer Center discovered, the user should be prepared to undergo the birth pains of a custom-built interface.

Dartmouth discovered just how painful custom building can be when it combined IBM 2314 disk drives with a Honeywell 635 (formerly GE). The 2314s were replacements for the Honeywell 204 (also formerly GE).

The 204, according to Leonard Cohen (operations supervisor at Kiewit), did not provide enough storage capacity for the Dartmouth Time-Sharing Service (DTSS).

Since there is no standard interface for a 635-2314 mix, a controller or interface was built on a special order. GE then subcontracted the order to Datametrics.

The Datametrics controller proved troublesome from the beginning [CW, Feb. 3]. In fact, the first controller had to be replaced, and although the replacement is now working it has proven occasionally unreliable in the past year.

Because of these intermittent problems, Dartmouth plans to replace the Datametrics controller with a controller built by the Apollo Support Division of GE. This device is currently being used by the U.S. Naval Academy with a Honeywell 425 (formerly GE).

Special Only

Neither the Apollo support or the Datametrics controller is available to the general user, according to Jim Lane (Honeywell Manchester, N.H., branch salesman). Of course, any users may always request a special order.

Lane adds that a special order such as Dartmouth made will not be necessary again since Honeywell now has for its 600, as well as 6000, Series a disk unit which is comparable to the 2314.

This Honeywell unit – the DSS 180 – is a modification of Honeywell's 278 disk unit and is reported to have more storage capacity than the 2314.

Dartmouth, nevertheless, is happy with its 2314 device. It presently has two units with eight drives per unit for a total storage capacity of 72 million, 32-bit words. The controller can also handle two additional units.

'Patching' Disks

Cohen reports that DTSS has enough capacity to keep disk storage in reserve for the expected extra use at the end of the scholastic semester. DTSS achieved this reserve by "patching out" two disks, thereby leaving two disks completely empty. The "patching" was possible because the 2314 is modular while the 204 is not.

In addition to the extra capacity and the modular disk drives, the 2314 device also has a size advantage over the 204. Dartmouth finds that the IBM units take up far less physical space than the 204.

Prime Time

Butchers et the James Allen & Sons meet packing plant in San Francisco view e different k ind of "late show" when they turn on the screen of an IBM 2260 display station shortly before midnight. They use the terminal to call information from computer storage about the order they are handling. Flashed on the screen instantly is the order, including the type, quantity and grade of meat. The computer-based order processing system speeds meat to the tables of California households.

NSF Funds DP Net For Universities

WASHINGTON, D.C. – A regional computing network designed to help upgrade the education process for participating Idaho, Montana and Washington State colleges and universities has been funded by the National Science Foundation.

Ten institutions will establish a cooperative computing network with NSF grants totaling $513,800. The participating institutions will contribute approximately $500,000 to the project.

$3 Billion of Idle Computer Time in U.S., Time Brokers' Hegan Tells Financial Heads

NEW YORK – "In 1971, there will be over $3 billion worth of idle computer time in the U.S., and $500 million worth of this could be sold if American businessmen treated the computer as a piece of industrial equipment rather than the special preserve of the technicians."

This statement was made to a group of the nation's leading financial executives at the American Management Association's 1971 Annual Financial Conference at the Americana Hotel by William P. Hegan, president of Time Brokers, Inc.

Hegan explained he has no quarrel with exotic computer applications programmers, since they have increased the efficiency of American business on thousands of occasions.

He did, however, say that keeping computer equipment on hand without making the most efficient use of this resource is crippling some companies' ability to compete in today's very tight market place.

Computer time had been sold for many years, he said, but it was not until the recession of 1970 that many well-managed companies realized that there were not one, but two ways to profit from the computer time market – by selling computer time, and by purchasing someone else's idle time, concurrently reducing the amount of expensive on-site computer power. The latter method has proven profitable for a growing number of companies, he reported.

The effect of the recession and recent initial deliveries of remarkably faster computer equipment has brought the situation to the most critical point in years, according to Hegan, whose company provides sales services for computer time and used computer equipment in large cities in the U.S.

He noted that computer time sales have increased substantially, and that a growing number of compsnies have reduced their in-house computer capacity, buying portions of their computer time requirements "outside" on a regular basis.

"When selling computer time, you must keep your customer's needs in mind, rather than your own requirements," he said. "You must put on your salesman's hat, and forget you're a manager with rigid schedules, pressing personnel problems, and a mountain of correspondence to be tackled."

Clean Up DP Room

He recommended that companies who desire to sell computer time should put their own house in order by cleaning up the computer room if it appears messy, reviewing production schedules and seeing to it that their operations personnel are well trained. Once an efficient in-house operation is established, it becomes easier to sell computer time.

Channels for the sale of computer time include talks with all of the salesmen who regularly deal with the data processing division, contact of other companies through personal solicitation, advertising by mail or in the newspapers, and the use of brokers.

During his talk, Hegan discussed factors which go into pricing decisions, credit procedures and the recent trend toward separate corporations to handle a company's DP requirements.

Virtual memory is the trend of the future. RCA's new computers have it. IBM's don't.

Virtual memory. A lot of people are talking about it, asking for it, and getting it.

But not with an IBM 370. They don't have it.

RCA has it. We've had it working for some time now. Working so well we put it in our new computers. RCA 3 and RCA 7.

RCA pioneered in virtual memory. But what does that do for you?

Virtual memory makes a computer work as though its memory were unlimited.

Which means it's hard to outgrow. And one of the main reasons most 360 users have to move to larger, more expensive computers is that they outgrow memory.

An RCA computer with virtual memory can do the work of a larger IBM computer with regular memory.

And work on more kinds of things. You can do regular batch jobs at your computer site, pipe work in from across the country, and put your people on time sharing terminals—all simultaneously.

With all that capacity, our virtual memory RCA 3 and RCA 7 are highly efficient.

Many regular memory systems get bound up by lack of memory and so don't work at full efficiency.

35% of the orders for our new RCA series are for computers with virtual memory.

It's practical right now.

RCA 3 is about half the price of any previous virtual memory system.

RCA 7 is equal to or better than IBM's regular memory 370/155 in price/performance, and has sophisticated time sharing capabilities the 155 doesn't have.

Virtual memory is the future of the computer business. A lot of people already need it. So we're making it. For you. Now.

RCA COMPUTERS

See the virtual memory RCA3 in action. Booth 1257. SJCC.

Editorials

Honor Roll

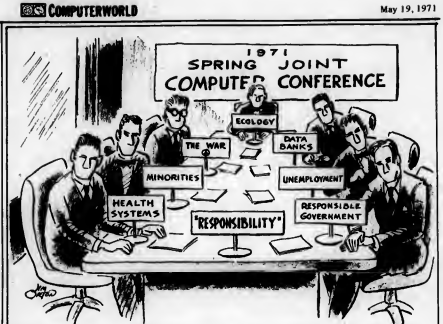
Someone once said, "If you can't say something nice, don't say anything." Unfortunately, if this rule were applied to bad situations, they would never be improved. And many computerized billing systems are an exemple.

However, our readers also are quick to come to the defense of good systems that shouldn't be tarred with the "bad name" of computerized billing.

This week's nominations for the honor roll are:

Allstate Insurance, by Michael Lowery of Malville, N.Y., for the efficiency with which one of its girls, using a CRT terminal, was able to retrieve information on his policy and to make changes.

Science Fiction Book Club, by D.G. Brand of Arlington, Texas, for introducing a more descriptive punched card and an extended "deadline date."



Letters to the Editor

Problems in Applications Also Exist in Systems

I would like to support The Taylor Report [CW, May 5] discussing computer errors. The problems he discussed in applications also exist in systems. Up until September 1970 I was involved in maintaining an OS-ASP system which was highly modified at our installation.

First look at the problems reported after each release of OS. Then look at the problems corrected by the ASP group. The process of deciding which part of the system, or which interface, was causing any newly reported problem of our users was more nearly an art than a science.

The correction of any problem was usually controlled by two considerations – the allocation by management of manpower and machine time to accomplish the correction and the considerations of perturbing the system in some other area.

If the ABM system had just 1% of the problems, I would consider living on another planet.

Kenneth L. Brown
(former) Systems Programmer

Prospect, Conn.

Computer Billing Errors — Is It Guilt by Association?

Alan Taylor's attack upon the Master Charge computer billing errors in recent columns is misdirected. Master Charge is not a guilty party in this instance. The bank issuing the card is at fault if doing its own billing, or the service center doing the billing for the bank is at fault.

Interbank Card Association has in excess of 140 banks issuing Master Charge cards. Each bank is responsible for the type of billing method they choose to use.

Taylor's reference to this error as a "Master Charge case" [CW, The Taylor Report, May 5] casts an aura of guilt by association over many banks which are doing an exceptionally fine job of Master Charge card accounting.

Taylor would be very indignant if the computer industry were indicted for the actions of one computer user. Yet he is indicting Master Charge for the actions of one card issuing bank.

Lee W. Allen
Assistant Vice-President
Data Processing Department

First National Bank
Mansfield, Ohio

Thomas J. Who?

With reference to your editorial on April 21 headed "Aren't You Listed Either?", I know who Seymour Cray is, but who is Thomas J. Watson Jr.?

George P. Burdell

Washington, D.C.

The Passing of the Data

Whether intentional or not, the cartoon of April 21 showing the handover of personal data by the Army to the FBI a la baton reflects a great deal of truth – that is, that the data (baton) is being passed incorrectly.

(Signature illegible)

Philadelphia, Pa.

A Place for Gobbledygook?

I agree with Alan Taylor about the arrogance of programmers/analysts.

A small example of lack of thought is your mailing label. I don't really believe that the postman is interested in the accounting information contained at the top of the mailing label. With just a little common sense and understanding of other person's thoughts, the designer could just as easily put the extraneous gobbledygook below the address (or it could be selected not to print on the label, only on accounting records).

Ed Dibble
System Consultant

Atlanta, Ga.

Postal workers read addresses from the bottom up. To speed sorting, the ZIP Code should be the last field. If the match code (gobbledygook) was suppressed, readers would not know their identification numbers, which are a major aid in processing inquiries. Ed.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

D.C. Training Program Brings DP Jobs to Ghetto

WASHINGTON, D.C. – Ralph Bailey is a 27-year-old programmer assistant – a trainee position – with Univac's Apollo Project Group at the National Aeronautics and Space Administration's Goddard Space Flight Center in suburban Greenbelt, Md.

D.C. Data-Line
By Alan Drattell

Until last Jan. 18 when he started, Ralph had been on the threshold of going to prison. He is now on five-years' probation.

Ralph got his start last summer when he became a student in a course run by volunteer computer professionals in Washington's black ghetto. Organized and run by a white 29-year-old Univac senior programmer, Herb Drucker, TOP (Training for Opportunities in Programming) completed its first seven-month cycle recently and graduated seven people. Five of them have jobs and Drucker is still seeking positions for the other two.

Ralph, during an interview at the Univac office at Nasa, said his family is black middle class. "My parents are both college graduates; my father is a lieutenant colonel in the Army. And one of my uncles is an executive with IBM." Ralph himself had one year of college training.

"But I guess I'm the black sheep of the family," he added, "I am a compulsive gambler. It cost me my marriage and plenty of good jobs. I was a horse man only. I knew everything about all the race tracks along the East Coast."

He said he "was on the street" for a year and a half. "I was gambling and hustling – doing funny things with checks." Arrested, he was placed on a year's probation, and while on probation was picked up again for possession of stolen mail and "uttering," a term he said refers to passing other people's checks.

"I knew I was in real trouble then," he related. "I was put on personal recognizance and to pass the hours I spent a lot of time in the library. I like to read. One day I noticed a poster about TOP on the library bulletin board.

"I'd always been interested in numbers. Not in the numbers racket; I never ran numbers. So I thought I might be able to complete the TOP course before my trial came up."

When he came to TOP, like most of the other students he was surprised to see that a majority of the instructors were white. "During class breaks, some of us students would get together and try to figure out why these professionals were giving of themselves to us. We had all kinds of weird thoughts and ideas. Maybe they were hired by some radical group to prove that blacks couldn't be trained."

The course was free and that made it doubly suspicious to many of the students.

Ralph found the instruction fascinating. "Once I got into the program, the numbers – octals and hexidecimals – that was my thing. Some of the students used to joke among themselves (that they could use the hexidecimals to code (policy) numbers and fool the cops."

Ralph joined the Washington chapter of Gamblers Anonymous, and when he went into court last December to face a possible jail sentence for violating probation earlier, he was able to prove to the judge that he was rehabilitating himself.

Now he's making $7,800 a year with Univac and has opened a savings account. "I haven't as yet opened a checking account," he chuckled.

As for his opinion of TOP, Ralph said: "It was the best thing that ever happened to me. I don't go along with a lot of cries of 'you owe me.' Nobody owes me a damn thing."

He now plans to return to TOP to help out the instructors in the next class cycle. "I believe I can help them because I was once one of the guys they helped."

After 10 Years CDPs Move to Get Organized

The Taylor Report
By
Alan Taylor, CDP

If I had had any doubt about the degree of dissatisfaction with current arrangements among CDP holders before my recent articles were published, I would have had no doubt whatsoever left after reading my mail.

Some of it came direct – and some of it went to *Computerworld* where some of it was published. The catalyst appears to have been Don Collins' letter [CW, April 14] calling for a questionnaire for CDP holders. Practically all later correspondence picked up his point – and agreed with it.

Across Country Response

From San Diego, where the examination is controlled and validated, William Maxwell, copying his own DPMA chapter, called for the changing of the CDP into a state-recognized certificate."

He also offered assistance in turning the CDP into "an autonomous institution, answerable to individual CDPs, but advised and assisted by DPMA, ACM etc." From Kansas Roger Gaunt of the University of Kansas called for "an American Institute of CDPs"; from Florida Harold Grace, of the West Florida Data Processing Center, told of his impatience with the reactions of DPMA and how he had now realized the fact that "as the CDP holders were the ones that want the recognition, so they should be the ones to get it promoted." And so on throughout the letters.

Two Groups Already Active

Even stronger than the individual responses, however, were two that came from Louisiana and Illinois. Both told not just of approval of a niceidea, but also of the actions they had already undertaken! Both had in fact already formed groups of CDPs into small oganizations – and were actively pursuing the goals of promoting CDP recognition. And while neither knew of other groups, both were looking for any other like-minded holders with whom they might cooperate.

The group in Jackson, La., was somewhat more formal of the two. It is a statewide group calling itself the "Society of Certified Data Processors." It was inaugurated in April, but is holding charter membership open until July. The president of the group is Charles Guest of the State Central Data Processing Authority; commercial people are represented by Jimmy Cox, secretary/treasurer of the Lamar Life Insurance Co.

But, while perhaps not the most formal, the most interesting in some ways came from Chicago – right next to DPMA's International Headquarters. Here was a group who had formed before my articles were written, and who were really getting serious about matters.

Calling themselves the Ad Hoc Association of CDP Holders (so as not to prejudice any resultant organization that may develop), the group decided in February that complaining was not enough – action was needed. So it broke up into three active subgroups, working on projects like holding open houses at the various computer conventions (including DPMA's at Houston and ACM's at Chicago), talking at various gatherings, investigating the attitude of the various societies, the uses that certification has in other areas, etc.

Their response to the Collins challenge was typical of them. First, they decided that they should write a questionnaire, then they let *Computerworld* and myself know of their intentions – and then they followed through.

Basically, what they wrote was the questionnaire on this page. (It has been modified to fit – their draft took four full pages!). I'd like to suggest that all CDP holders, and other interested parties (including John Seitz and other uncertified data processors) fill it out and return it to me to pass on to the Ad Hoc Association, and other CDP groups that may appear. I think that this would be a first positive action for many of you to make towards improving the CDP status.

But while the activity showed real life, none of it appeared to meet some of the hidden problems, or even to acknowledge their existence.

And there are some hidden problems involved in the upgrading of the CDP status. First among these is the old devil – money. While at International Headquarters I was told that running the examination was profitable to DPMA, but no estimate of how profitable it was could be made. Donald MacPherson, who heads this activity, said that he could not guess [CW, April 14].

Well, I cannot guess – but I can calculate. After the recent increase the cost of proctoring exams is nefw up tby about 50%) to around $1.50 per taker. Out of the standard $50 fee. That's peanuts – and that is the only "major" cost that MacPherson could give me. Otherwise he recounted the cost of committee meetings, and of the marking and the validation study.

These, or closely equivalent, services are provided by other commercial organizations at about 20% of DPMA's fees, so assuming that DPMA is not more than twice as inefficient in these areas as commercial competitors, then around $80,000 a year can be accounted for. This leaves, for 1970, a cool $100,000, which can simply go into DPMA general funds without anyone being any the wiser. One hundred thousand dollars a year is not peanuts, and it does form a possible stumbling block that the CDP holder groups will have to deal with, because money talks awfully loud nowadays.

So, I wish the groups well – and intend to join the Ad Hoc Association. Again, I urge holders to fill in the questionnaire, to write to this and other papers, to DPMA chapters, and to me. It is only with this type of action that success will be made possible.

CDP Questionnaire

Sponsored by the Ad Hoc Association of CDP Holders

After circling those answers that you agree with, please give your name and address. Return to Alan Taylor, CDP, c/o Computerworld, 797 Washington St., Newton, Mass. 02160.

Is the CDP Important to You?

1A. Should an independent CDP holders' organization be formed? — 1A. Yes / No – Form DPMA sub group instead / No – No such organization is needed

1B. Would you care enough to consider joining? — 1B. Yes / No

The CDP Examination

2A. Should the principles of management and mathematical method sections be eliminated? — 2A. Yes – Eliminate both / Yes – Eliminate principles / Yes – Eliminate math. method / No – Keep both

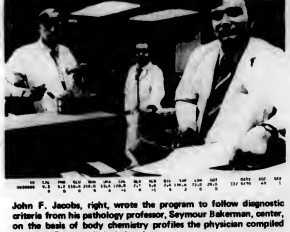
2B. Should the examination be changed? — 2B. Yes – Add essay questions / Yes – Make it more difficult / Yes – Make it easier / No – Leave it alone

The Preparation and Publication of the CDP Examination

3A. Should other groups assist in preparing the examination? — 3A. Yes – Other professional societies / Yes – The CDP holders / No – Keep it as is

3B. Should the examination be published after being given? — 3B. Yes – Without answers / Yes – With answers / No – Keep it secret

Name (with CDP if held) Address



John F. Jacobs, right, wrote the program to follow diagnostic criteria from his pathology professor, Seymour Bakerman, center, on the basis of body chemistry profiles the physician compiled with Roy Davis, a clinical chemist.

Medical Students Can Test Diagnosis With Computer

RICHMOND, Va. – Medical students here have one of their own to thank for a new classroom aid under development: computer-generated diagnoses for quick comparison as they learn how to recognize diseases.

An IBM 1800 computer suggests diagnoses from results of routine patient tests it collects every day as the control point of a complex laboratory information system for the Medical College of Virginia and its 1,000-bed hospital.

At the top of the printout are the patient's identification number, the laboratory tests on which the computer bases its diagnosis, the date of the tests and the patient's age and sex. The first row of numbers lists the amount of each test substance in the patient's blood sample. Directly below are the M-values for each test.

Normal Test

An M-value of zero means the test is normal. The 1800 first scans a master table in the diagnosis program to match abnormal M-values with diseases, then assigns a probability factor. The greater the number of abnormal M-values that point to a disease, the higher the probability.

Radar, Scanner, DP Combine Talents To Produce Computer-Painted Pictures

CW Midwest Bureau

LAWRENCE, Kan. – Man has chiseled away at marble, applied paint to canvas with a brush and a knife, even welded metal to metal and called it art. Now he can throw away his chisel, brush, knife and torch and pick up a radar antenna, a photoelectric cell and a computer. A new art form has arrived.

Two men, faculty members of the University of Kansas here, have combined talents to produce the new art medium. Richard Schirs of the painting and sculpture faculty and Robert Haralick of electrical engineering recently displayed samples of "pictures painted by a computer."

Haralick originally worked with digitized images in black and white, solving the problem of getting reproductions with good grey tones by overprinting characters on top of one another to get darker shades. Schirs brought in the problem of using color.

A negative transparency is scanned by a photocell, with the scanning converted to analog voltage which is taken to a digital converter which converts the voltage into a six-bit binary number. This is then put on tape for a GE/Honeywell 600 at the university's computation center.

The tape is run, converting the 64 possible binary numbers to 13 approximately equally occurring numbers. Each of the 13 binary numbers is then assigned some color combination, mixtures of red, green and blue densities. The final printout is run three times, once for each color.

Haralick, an artist himself as well as a computer professional, explained that "once the artist becomes caught up being the computer scientist he loses that spontaneity that helps him create."

Automated Study of Arts May Enlighten Supporters

By a CW Staff Writer

NEW YORK – A massive computer-aided study of the performing arts may provide for the first time a detailed picture of their financial health.

The study is being undertaken by the Ford Foundation to give those who run arts organizations a better picture of their own industry, and to give financial supporters of the arts more solid information, and thus hopefully to increase their willingness to contribute money.

Actual cost of the study is not set, but it could be as much as $600,000 according to a Ford spokesman. The foundation will use its own IBM 360 to compile and analyze data from about 200 organizations, including theatres, orchestras, opera companies and dance groups.

Performing arts organizations cannot hope to cover costs merely on the money taken in at the box office, and thus they depend on outside contributions.

Anna Steele, director of the National Arts Endowment's Office of Research, said: "We are delighted that Ford is doing the study. It will definitely help us make our case to Congress."

Despite the high cost of the study, she argued that it is a wise investment, because corporations will be more likely to give money if they understand exactly where it is going.

Each of the 200 organizations will fill out long questionnaires on income and expenses for the past five years. These will be fed into the computer, which will analyze the data on three different levels: for the nonprofit performing arts as a whole; for each of the four types of arts groups – theatre, symphony, opera and dance; and within each type category according to budget.

Each arts organization will receive a printout with an analysis of its own growth rate.

British Citizens Show Their Ire At Touchy Questions in Census

LONDON – A bonfire of census forms in the market in Bristol highlighted the protests against the recently completed British decennial census.

Objections to the census were similar to those voiced in the U.S. during its census last year – that the questions themselves and the distribution of the resulting data represents an invasion of privacy.

As in the U.S., the Census Office here promises that it will not release data on identifiable individuals, but also as in the U.S., summary data may be sold on small groups of persons, possibly as small as groups of 50 households.

Member of Parliament, Leslie Huckfield, one of Britain's leading privacy campaigners, warned that many companies "of rather dubious bona fides" had expressed an interest in buying census data.

As in the U.S., the data will be computerized after it is collected. William Whitelaw, leader of the House of Commons, assured Commons that no names and addresses would be put into the computer and that it would be impossible to connect names and addresses with the census data on computer tape. Huckfield charged that it is possible to extract personal dossiers from the statistical data bank.

The British Computer Society recently offered help to the Census Office in safeguarding privacy, and the Census Office announced that it would accept help from the computer society or any other responsible body. It is not clear at this time if the Society and the Census Office have actually gotten together.

Two questions on the census form have drawn particular ire. One asks women how many illegitimate babies they have had. The other asks immigrants their country of origin.

UK Merchants Get National Service For Accounting

Special to Computerworld

LONDON – Systems design and specification by the National Computing Centre, and bureau services from the National Data Processing Service (both UK Government-controlled bodies), have made computerized accounting a practical reality for at least some members of the National Federation of Builders' and Plumbers' Merchants.

Members of this federation are generally small companies for whom individual development would be a financial impossibility, but who have a basic need for computerization thanks to the complex pricing structure of the building industry.

The federation approached the NCC, a move which resulted in the production of systems specifications for a suite designed specifically for builders' and plumbers' merchants.

Rural MD of the Future – Part III

Team Spurred by Common Goal

By Thomas J. Morton
CW Midwest Bureau

SALEM, Mo. – In a country doctor's office one mirne was running cards through a reader to update a patient's file, while another was taking an electrocardiogram (EKG) directly online to a 360 system 130 miles away.

The doctor's secretary was calling for a copy of a recent article on gastrointestinal disorders from a data bank in the same computer, and all the while an elderly female patient was answering that same computer's questions on a IBM 2260 terminal.

Dr. B.J. Bass, putting aside a printout history of one of his patients, agreed that it was indeed a strange sight. "We have bridged the gap," he said, "between the technology available in a [medical] research center and the patients of my clinic in this small town."

Then he smiled and added: "All of this looks so smooth today, but a few months ago, when the telphone installers came in with the data phones, they didn't even know how to install them." His grin broadened. "There aren't too many computers in Dent County, Mo.," he said.

Bass' office is in Salem. The computer serving him is in the engineering school of the University of Missouri in Columbia. Between these two points lie 130 miles of rolling, rural Missouri and three telephone companies: Southwestern Bell, General Telephone and United Telephone.

> *"Dr. Bass kept telling us," said Dr. Earl Simmons, "that it seemed terribly unfair to him that we could have computerized 'automobile maintenance programs and not have human being maintenance programs at the same time."*

"You will never believe," said G.E. Adams, director of data evaluation and computer design of the Advanced Technology Project, "the interconnect problems we had. No two companies had two of anything that would be compatible with two of anything the other company had.

"But I have to say that the cooperation we received was simply fantastic. Christmas week, engineers from those three companies and people from engineering, University of Missouri met and drew up designs for the interconnects.

"But some good thinking and some hard work, and we're connected now. And connected to stay! We haven't been down because of a connect yet, and no one can really say that we expect to go down because of connect problems."

"One of the problems brought about as what seems to be consequence of modern education is an inability to communicate," Bass said. "Can you imagine how dense a physician can appear listening to an engineer explaining a computer program's requirements? And the engineer, when the physician is explaining the requirements of blood chemistry?"

But that barrier was broken. Broken, Bass said, because everyone, aware already of the need for health care in this country, was convinced that the physician's office is the place where most of the care can be administered, has to be administered, in some cases.

Another problem faced the team. The problem of the nurses and the medical secretary who would have to run the equipment and the patients who were going to use it.

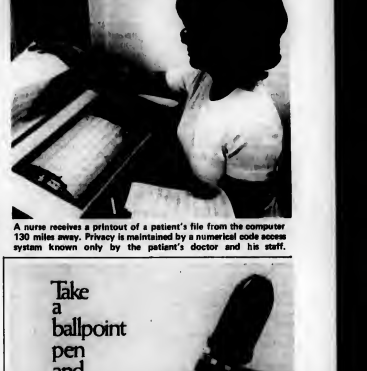
The programs were developed in such a way that they "received" errors, analyzed them, and instead of just declining to provide data the computer would offer instructions on how to correctly obtain it.

"And just when we figured," Adams said, "that we had all the possible entry errors possible and programmed around them, the doctor's girls would give us some more."

So the programs were refined into the fail-safe operations. No matter what the operating amateurs do, the computer leads them back on the track so that the requested information or analysis is properly received.

"Which," Bass added, "brought us to the subject of the privacy of the patient. Since it was easy to get things out of that computer, we had to make very sure of what went in."

What does go in is the personal medical record of the patients – but entered in such a way that a complete dump would not identify any individuals. Particularly descriptive information, such as the patient's name and address, his particular history or symptoms, are never entered. Access to the individual's records are only by a number assigned by the doctor's staff, and can only be made from his office.



A nurse receives a printout of a patient's file from the computer 130 miles away. Privacy is maintained by a numerical code access system known only by the patient's doctor and his staff.

Russian 2d-Generation Computers Reported in Use in North Vietnam

By a CW Staff Writer

HANOI – Russian second-generation computers have been in use here for several years, according to a recently returned American biologist.

Some computer centers in North Vietnam have Minsk 22s, which roughly compare to an IBM 1620, Richard Levins said. The computers use paper tape cards and a magnetic tape thicker than that used in the West, he reported. Three languages are available: Algol, Fortran and Tam (a Russian language).

The computers are dispersed at various centers, Levins said, both to reduce damage from bombing, and to give as many people as possible direct access to the computers.

Uses of the computers include economic and industrial planning and university research, particularly in the engineering area. In at least one region, Levins added, the health records of the bulk of the population have been computerized as part of the public health program.

Levins was the only American in a group of six scientists who spent two weeks in North Vietnam in December on a trip organized by the World Federation of Scientific Workers.

The North Vietnamese are now developing computer science programs, he said, and are also trying to design their own terminals and calculators.

The North Vietnamese need computer literature, according to Levins, particularly about hardware, integrated circuits and numerical methods.

Over 6,000 Demonstrators Data Banked

WASHINGTON, D.C. – Information on over 6,000 of the demonstrators arrested here during two weeks of antiwar protests has been filed in a computer data bank maintained for the local police for the U.S. Attorney's office.

The computer system is used by the U.S. Attorney's office for scheduling court appearances [CW Oct. 21, 28, 1970]. The largest number of cases put into the computer came from arrests at the Justice Department – more than 4,300 in two separate incidents. Offenses ranged from disorderly conduct to assaulting a police officer to drug charges to indecent exposure.

By early last week most of the 7,000 picked up for blocking traffic May 3 and held in a football field had not been added to the computer files because specific charges had not been brought against them. Nearly all were fingerprinted and photographed, however, and copies of this data will be given to the FBI.

The U.S. Attorney's office got about 1,500 of the mass arrest cases – those affecting the U.S. and not the District Government and those for offenses such as unlawful entry and parading around on Capitol grounds in a noisy and boisterous fashion.

The official said that only those cases involving the use of drugs and misdemeanors were put into the computer system. The reason: "It was a judgment decision. It would have been difficult to paper (fill out) all the forms that were necessary and putting all the cases into the computer would not give a true picture of the crime rate in the district; it would throw the data base all off."

Semper Paratus?

CW Washington Bureau

WASHINGTON, D.C. – Data processing installations in federal agencies took little or no unusual precautions against the thousands of Vietnam war demonstrators who attempted to tie up this city and prevent the government from functioning.

A spot survey by CW disclosed that most agencies did little more than have their employees report earlier to work than normal in an effort to foil attempts by demonstrators who blocked roadways in the city.

A spokesman for the Department of Justice said that guards had been placed around the building, but there were no special details inside. Employees were ordered to report to work on Monday by 5 a.m., however.

And a spokesman at the Pentagon, one of the prime targets of the demonstrators, said that there were no special precautions takan at the data center. Individuals reported earlier than normal if they wanted to, but "there was no DoD-wide order" to do so.

Tunney Offers Unemployed Aid; Job Bank Hit

CW Washington Bureau

WASHINGTON, D.C. – Some financial aid was offered out-of-work technical people by a senator recently, but a Labor Department official had some discouraging words for engineers who are using a computerized job bank in Sacramento, Calif., in an effort to find work.

Sen. John V. Tunney (D-Calif.) told the upper chamber that he would offer an amendment to a bill now being considered "that will bring direct assistance to those who may be among the most unfortunate of the unemployed – the victims of cutbacks in government contracts or operations."

The amendment would provide aid whenever substantial unemployment results from cutbacks in federal contracts or curtailment or closing of military bases and other government facilities. It could assist these individuals with mortgage payments, loans and income until they find new work.

Tunney said that currently five million Americans are unemployed, 700,000 of them in the State of California alone. "Nationally, 800,000 persons have lost defense-related jobs in the past year; in California, 172,000 aerospace workers have been thrown out of work since 1968, and the figure will reach 200,000 by the end of the year."

Meanwhile, Fred E. Romero, acting director of Labor's Office of Technical Support, told CW he is "disappointed with the number of job orders" received by the computerized job bank clearinghouse in Sacramento. As of about mid-April, the bank had enrolled 5,000 job-seeking engineers and had only about 800 jobs listed.

Romero added that he thought "the machinery we set up is good," but he thought the bank "would have more jobs" than it does.

Bomb Threats Threatening

NEW YORK – Businesses should develop elaborate serch procedures before they receive bomb threats, since many companies elect not to evacuate a building, according to an expert in the bomb field.

New York Police Sgt. Terence McTigue told attendees at the American Bankers' Association Automation Conference recently that bomb threats, not bombings, present the greatest problems for computer users.

McTigue said that, for "legal reasons," the city's police department recommends evacuation, but the choice is left to the individual.

Harold Weiss, director of the Automation Training Center in Reston, Va., noted there had been 4,330 bombings in the country in the last 18 months, many of which involved computer centers. He said the considerable time and money involved in recovering from an EDP disaster necessitates planning for backup facilities and software, as well as forms and other supplies.

Cities Can Learn Much About DP Service

By Phyllis Huggins
CW West Coast Bureau

SHERMAN OAKS, Calif. – "The biggest mistake cities make is not paying enough to hire really qualified people for the data processing job," said Raymond Wood, president of a CPU firm which specializes in municipal data processing.

"This is further compounded by the fact that there just aren't enough people who are skilled in both finance department knowhow, systems and procedures and computer programmings. As a result they hire a programmer who can't communicate with the finance department and vice versa."

A case in point is Banning, Calif., population 13,000. The town installed a computer, hired a staff and then the troubles began. Finally the town fathers turned to Wood. His recommendation was to forget the computer and use a service bureau. The town now has a net savings of $34,000 a year. With its own system it was costing $1.25 to send out each utility bill. It now costs 34 cents each.

Ed Brown, finance director of Banning, is enthusiastic over the results. "We didn't just hire a service bureau, we got expert consultation. Being able to obtain both from one source is the way things are going to go in the future." Wood spent seven years as finance director of Beverly Hills before forming his own business.

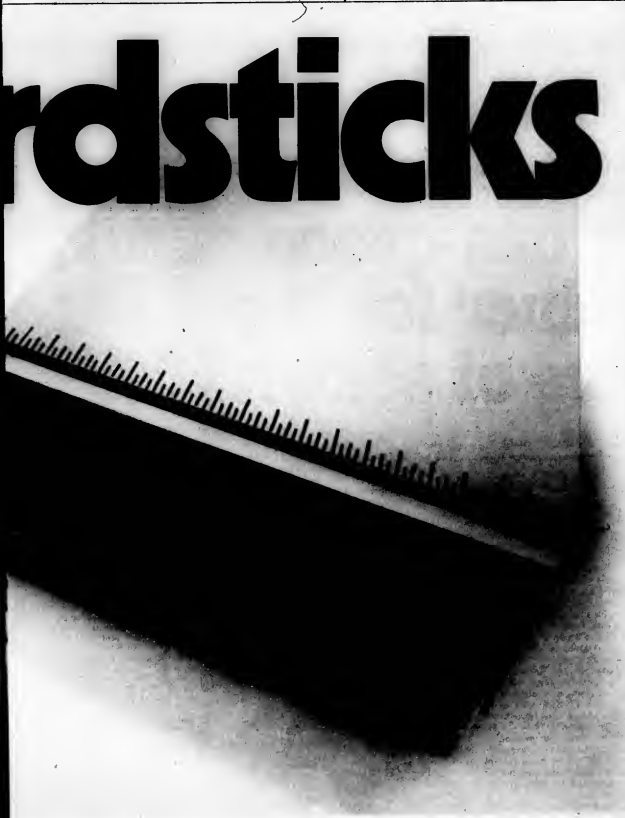
Nine cities are now his customers with populations ranging from 6,000 to 40,000.

A city can obtain for about $800 a month a complete finance package including payroll and accounting, journalizing all accounts, detail revenue and expense ledger and monthly statements.

"Furthermore," said Brown, "we print out all the data. Computerized systems are criticized because there is hidden data. We don't go that route. It's all there the same as if it was a hand-drawn ledger. This may be considered inefficient as it takes more computer time but it's the use by the customer, not efficiency, that is important."

A CPA by profession, in addition to providing the systems and DP needs of the cities, he also serves as finance officer in some cases. He attributes the success of his service to solving the problem of communication. "I know enough about programming so that I can communicate with my data processing man and he knows enough about accounting so that he can communicate with me. Neither of us could do the other's job but we can work together. This is the key to our being able to develop packages which we were told couldn't be done."

The firm rents time on outside machines. "There are plenty of them around with time available." It requires an IBM 360/30 with 65K of memory but is working up to larger requirements. There are some 30 programs in their library.



DP Does Help

HOUSTON – The power of the computer was given a testmonial by Nasa regarding the Apollo 13 moon flight which left its flight path last year. Within minutes computers had figured out the corrected path flight and brought the mission under control. The calculations involved were extraordinary. In order to save the mission it was necessary to compute the around-the-moon-and-back trajectory.

Nasa says one man working with a pencil could have done it in 1,040,256 years. A desk calculator aid would have produced the necessary calculations in 60,480 years. With DP the flight was corrected in 84 minutes.

Odds and Evens Are Out

OKLAHOMA CITY, Okla. – Santa Fe Railway trains no longer bear an even number to indicate eastbound trains, or an odd number for westbound trains, but instead are coded in computer-decipherable numbers.

Each train is now identified by a three digit number. The first digit indicates point of origin, the second, type of traffic, and the third, destination. The number is followed by a letter code indicating the date the train departed from point of origin.

Unalterable License

The State of New Jersey is reportedly the first in the nation to issue drivers' licenses that use unalterable computer printout. American Bank Note Co. developed the licenses. The documents utilize color: those under 21 years of age will receive an orange license. The printout uses fluorescent printing, raised images and sensitive inks.

Municipal Center May Solve Tax Crisis

By Edward J. Bride
CW Staff Writer

MALDEN, Mass. – It's a small operation, Malden's DP center, but some day it may become a municipal computer utility for surrounding towns, according to Mayor Walter J. Kelleher.

Officials of this city of 50,000 may have discovered an effective way to ease the financial crisis plaguing many municipalities of comparable size with this utility approach.

The center would actually serve surrounding municipalities plus small businesses which might not be able to afford their own DP equipment but which nonetheless need computer work, and which would like cheaper prices than many commercial firms can give.

The city has just taken delivery of a leased Honeywell H-125, according to DP Director Charles Hendrickson, who anticipated the municipal center would be able to serve the private business sector.

"We'll be super-competitive," Hendrickson promised, "taking every business we can get." He said the Malden DP center could do "as good a job as commercial firms, or better."

The 125 has not been "powered-up" yet, Hendrickson noted, as the air conditioning is expected to be installed shortly. He predicted the city's payroll and water billing systems would be implemented soon.

Hendrickson programmed those two systems himself and is reluctant to use Honeywell software. "I'm an alumnus of Honeywell's operation," Hendrickson told CW, "and I don't plan to use their canned programs. When I use another computer facility, I take my own compiler with me."

He did say, however, he might use Honeywell's class scheduling program if the center takes on the anticipated educational applications, including scheduling and grade reporting.

Paying for Itself

Kelleher said the system should be paying for itself within three years, owing to savings in some billing applications and selling services to other cities and towns.

Hendrickson, who described himself as a "working manager," said he would be developing a municipal information system, based on what the other city departments need from his computer center. He claimed his own software would be more efficient and faster than that of the vendor.

The Malden computer is a small one, with 16K of core. Located in a clothing factory with a larger H-200 available for backup, the DP center will move when a new city hall is built, about 1974.

Thus the current locale is temporarily permanent, he agreed.

Of prime interest now, however, is "getting something going" to justify the cost of the new equipment, about $100 a day.

State to Loan Printing Unit To Highest Bidder

ST. PAUL, Minn. – Innovative uses of computer equipment already installed generally bring cost savings or other efficiencies.

The State of Minnesota is considering such an innovation, offering an option for publishers of this year's new laws to use the state computer's photocomposing type.

In preparing specifications for bids for printing the 1971 laws, Revisor of State Statutes Joseph Bright called the option "a new idea that hasn't been tried before."

The Minnesota Legislature is reportedly the first to use a computer for the actual typesetting of a legislative session's bills; several states use a computer/video terminal combination to inform users of the status of these bills in the legislative process.

The bids will be accepted for work in standard printing form, or using the computer tapes, or both, Bright stated. The idea, of course, is to enable the state to sign the lowest-price contract possible, even if the vendor has to use the state's equipment.

Many Tables, Diagrams

Systems Program Designers Get Tools

By Oscar Firschein
Special to Computerworld

Designing Systems Programs, by Richard Gauthier and Stephen Ponto, Prentice-Hall, Inc. Englewood Cliffs, N.J., 1970, 274 pages, $10.50.

This book deals with the basic tools used by the systems programmer in creating a language processing system. The first two sections, which can be read independently, discuss techniques and procedures for language processing. In the last section, a subset of a scientific compiler is designed to indicate how these tools are applied in actual systems construction.

Part A, techniques in logic, covers the use of Polish strings, syntax directed methods, programming languages, and syntax driven algorithms. Part B, techniques in data management, covers data presentation and search structures.

The balanced tree search material, although complicated, will be of interest to those dealing with the retrieval of data items from a data structure.

Finally, Part C, system application, covers the definition of a sample compiler system, elements of design, sample system design, and sample system implementation.

The book can be read by anyone with some programming experience. The notation used is straight-forward, and many flow diagrams, trees, and tables are used to clarify the exposition. Many of the operations are traced out in great detail. Exercises are given at the end of each chapter, with answers in the back of the book.

It is unfortunate that the authors did not provide references or bibliography to allow the reader to explore some of the more advanced concepts on his own.

In spite of the clarity of presentation, it is easy to not see the forest because of all the trees (and tables and diagrams), and the reader should refer to the dependence diagram given at the beginning of the book from time to time to see how it all fits together.

Oscar Firschein is a member of the Information Sciences Laboratory, Lockheed Research, Palo Alto, Calif.

Volume Offers Compiler Writer Series of Aids

By Ned Chapin
Special to Computerworld

A Compiler Generator, by William M. McKeeman, James J. Horning, and David B. Wortman, Prentice-Hall, Englewood Cliffs, N.J., 1970, 527 pages, $13.95.

Here is a book to help a user write his own compiler. A set of aids to the compiler writer are presented, including a program to translate from a BNF description of the source language to syntax tables, and a table-driven preliminary translator program that links language syntax with the user-prepared object-language ("semantic") routines for the operations desired.

A program to finish the translation process is also provided. The basic language medium used is XPL, a dialect of PL/1.

The first part of the book deals with theory, covering such topics as parsing, LR(K) grammars, stacks, and the organization of translator programs. The theory is presented abstractly with much use of symbolism, but does not provide exhaustive coverage.

The second part deals with the three aids cited above, after presenting XPL. The use of symbolism is more relaxed, and is made more realistic by the abundance of exercises for the reader. But the treatment is fast, and even the authors recommend the use of supplemental materials.

The second half of the book is appendices, with lists and brief explanations of the programs. A discussion of fitting a compiler to work within the confines of an operating system comprises the first appendix. The stress in the book is on the IBM 360.

The index is very short — not even four pages — and nearly half of it deals with the special terms and names used in the three programs. The book really is better than its index indicates.

Ned Chapin is an independent consultant in data processing.

COMPUTERWORLD

book reviews

'Case Studies' Presents DP Problems

By James A. Robb
Special to Computerworld

Case Studies of Business Processing Systems, by Gerald Wohl and Michael D'Angelico, Richard D. Irwin, Inc., Homewood, Ill., 1970, 161 pages, $5.25.

This three-ring, perforated-page workbook provides an excellent selection of moderately complex case studies in data processing. It is extensively illustrated with logic diagrams and procedure flow charts as well as detailed samples of input-output formats.

The book could be used as a source of problems for a programming course in any of several business languages.

In addition to the problems, four appendices provide additional information regarding programming techniques.

James A. Robb is faculty chairman, Vocational Technical Institute, University of Southern Illinois, Carbondale, Ill.

Mini Text Covers Fortran IV

By Paul F. Hultquist
Special to Computerworld

A Course on Programming in Fortran IV, by V.J. Calderbank, Chapman and Hall, Ltd., London, 1969, 88 pages, $4.

It is truly a delight to find a book such as this. All of Fortran is a small volume. Even exercises, answers to the exercises, and two sample programs are included, including a least squares curve fit and a subroutine for one step of a Kutta-Merson integration of a set of ordinary differential equations.

Nothing is said twice, nothing is missing either. The reader must pay close attention, but that is not unpleasant in view of the civilized literary style.

IBM System 360 Fortran IV is described. The author usually points out the variations of this dialect from ASA Fortran, but she does not mention the existence of other variants, and in at least one case denies their existence, for example the possibility of having more than one Fortran statement per card. However, such complaints are relatively minor.

A few illustrations of what happens when one violates the rules and a few annotated programs, complete with printed out results, would make it easier for the beginning programmer to grasp the subtleties.

Paul F. Hultquist is assistant dean and professor of electrical engineering at the University of Colorado, Boulder.

JCL Textbook Not Aptly Named

By Walter J. Samek
Special to Computerworld

OS/360 Job Control Language, by Harry W. Cadow, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1970, 301 pages, $12.

This is an interesting book filled with useful facts, but it does not achieve its stated goal. Rather, it gives us wide ranging discussions of many subjects related to the 360, a description of and introduction to JCL being only one of these, and not a very big one at that.

It is written in a pleasant conversational style, and tries to anticipate the reader's questions. It thereby supplies a large amount of useful information designed to help the novice "computerite" understand the intricacies of OS/360.

The book is intended as teaching material for vocational schools and junior colleges, but the first sentence of the introduction reads: "Probably the most complex body of knowledge in existence today on the topic of computers and data processing is the Operating System (OS) for the IBM 360."

Now if I were a student in one of the above mentioned schools, I'd be scared out of my wits by this sentence, and would switch to a Fortran or Cobol course instead.

The first chapter starts out with an idyllic analogy of the computer as a data factory, but it quickly gets into deep water, introducing a fictitious machine language for one page and abandoning it again.

After that it goes right to the heart of 360 machine language.

The next chapter goes into a discussion of I/O devices, including card codes, keypunches, etc., concepts not even remotely relsted to OS/360 JCL.

And so it goes all the way. There is way too much detail for the beginner, not enough detail for the advanced student, and insufficient organization for systemstic self study.

There is then only one purpose which this book may be able to fulfill: It could be used for review of OS/360 concepts by people with some experience in the subject.

Walter J. Samek is associated with Combustion Engineering Inc., Windsor, Conn.

'System Structure' May Cure Myopia

By William W. Cotterman
Special to Computerworld

System Structure in Data, Programs, and Computers, by Lyle R. Johnson, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1970, 303 pages, $12.50.

Far too many practitioners of the computer and data processing arts see the elements of their work environment as a series of islands. Computer hardware, data structure, and programming are basically seen as objectives to be approached and studied one at a time. Worse, one may see only one island or we may forget that an island is merely the tip of a mountain.

This book is a cure for these various forms of myopia. The author begins with a detailed examination of the tree diagram as the basic unit of structure and then expands into a systematic consideration of data structure, the representation and manipulation of data structures, program structure, and finally, the data system.

It does not qualify as easy reading. By his own declaration, the author has "aimed at crispness in style and frugality in detail." Little mathematical background is required but the discussion is rigorous.

The book suffers from an excess of new or at least not commonly used terminology. The author is very careful to define all of his terms but many are simply not necessary to an understanding of his discussions.

This is an excellent book and is recommended reading for those whose besieged and buffeted perspectives need widening.

William W. Cotterman is president of Computer Educational Services, Atlanta, Ga.

Simple, Complex Concepts Of PL/1 Included in Book

By W.S. Hoffman
Special to Computerworld

Problem Solving by Digital Computers With PL/1 Programming, by Andrew Vazsonyi, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1970, 518 pages, $12.95.

Unlike most books about PL/1, this text presents illustrations relevant to both commercial and scientific programming. Concepts ranging from the elementary principles of computer usage through advanced techniques such as simulation of stochastic processes are covered.

While PL/1 is not covered completely, a very reasonable subset, including many subjects omitted in other tests, is described.

W.S. Hoffman is with the Information Systems Division of E.I. duPont de Nemours, Inc.

DPMA Briefs Executives on DP

By Thomas J. Morton
CW Midwest Bureau

Executive Briefing on the Control of Computers, by Leighton F. Smith, Data Processing Management Association, Park Ridge, Ill., 128 pages, $9.75 ($7.80 for members).

This book extends the association's activities beyond corporate DP departments into the executive suites and "was prepared to help the executive establish practical control mechanisms through which he can manage his data processing organization," Smith states in his introduction.

The author contends that the man in the executive suite must learn how to manage his DP organization and that the typical executive "has shown neither the time nor the inclination to learn the detailed technology of the computer."

This fault, Smith writes, has taken the control of data processing away from management. "If, in fact, it [management control] ever existed."

DP Problems

Smith's book takes the executive reader, the non-DP knowledgeable top-management man, through the problems he faces with DP, including a perspective for the computer, people problems, audit systems and cost controls, to a methodology to evaluate the effectiveness of the DP operation he should be managing as a part of the whole corporation.

Book Reviews

National Computing Centre Work Outlines Management Functions

By James A. Robb
Special to Computerworld

Management of Computer-Based Data Processing, by The National Computing Centre Ltd., New York, 1970, 96 pages, $10.

In September 1968, a Steering Committee of the National Computing Centre set out to examine the functions, problems, and educational requirements of DP management personnel in the UK. Its objective was to develop recommendations which would lead to the adoption of a national program of training in the basic skills for DP management.

The work of the committee as well as its findings, conclusions, and recommendations are carefully outlined. Seven appendices provide very valuable reference material for anyone interested in DP education or management.

Included are lists of management functions, existing courses as well as proposed courses, personnel and companies involved in the study and a current, classified bibliography of well selected books and articles.

This book, with its concise outline format, would serve as an excellent supplementary text for any management level course.

James A. Robb is faculty chairman, Vocational Technical Institute, University of Southern Illinois, Carbondale, Ill.

Essays Consider Value Conflict Of Man, Machine

By Yudell L. Luke
Special to Computerworld

Automation and Society, Edited by Ellis L. Scott and Roger W. Bolz, Center for the Study of Automation and Society, Athens, Ga., 214 pages, $5.75.

The concept that a highly developed society producing machines for destruction could readily change direction and apply its resources to produce goods and services for the benefit of mankind was a byproduct of World War II.

Automation was held to be the key to success and its results would benefit mankind. Automation demands a systems approach and an integral part of the system is man himself.

Quite obviously the hopes, aspirations and promises of the fifties and sixties have not materialized. We are held up on a value conflict. What is the conflict and how can it be resolved?

The volume embodies a collection of essays given at the First Annual Georgia-Reliance Symposium on Automation and Society on this subject.

Yudell L. Luke is professor of mathematics, University of Missouri, Kansas City, Mo.

Book Describes Hardware Operations in Three Parts

By William C. Cotterman
Special to Computerworld

Basics of Digital Computers, Revised Second edition, by John S. Murphy. Hayden Book Co., Inc., New York, 1970, 391 pages, $11.25 cloth, $9.95 paper.

This book consists of three short volumes which, although combined into a single volume in this instance, may also be purchased separately.

The first volume, an introduction to the computer, contains chapters on the history of computing, data representation, computer arithmetic and the central processing unit and programming.

The development of much of the material is overly brief and somewhat sketchy.

Book Reviews

Volume 2 deals with the nature and operation of the circuitry and of the basic units of the computer. The author proceeds from AND and OR elements to the building of these elements. Functional units such as registers, transfer busses, binary counters, and the operation of storage and the control unit are included. The latter two topics are particularly well covered.

Volume 3 is concerned with input and output.

The discussion of specific equipment types is followed by chapters on input-output controls, system organization, and I/O subsystems.

The book is strictly hardware-oriented and would not be effective as the first introduction to the computer field.

A reader with some knowledge of computers and programming, however, will find that this book provides an interesting and informative view of the internal operations of computer hardware.

Exercises a Must

By Ned Chapin
Special to Computerworld

Programming with USA Standard Fortran and Fortran-IV, by Donald D. Spencer, Blaisdell Publishing Co., Waltham, Mass., 1969, 243 pages, $5.25 paperback.

What makes this Fortran book different? First, it is a combined text and workbook, complete even to coding forms.

Second, it is a shorter book than its page count suggests because of blank pages and lots of white space. Third, it does use Fortran. Fourth, it does not use Ansi flowcharts. Fifth, it does not offer the depth of coverage that some other books do it is designed for a quick overview.

To use it effectively, the reader must work the exercises as well as read the text.

New Literature

A revised bulletin is now available listing the application software programs for the DEC PDP-10 computer, as well as standard DEC-supported software. Contact: Edgar E. Geithner, Digital Equipment Corp., Maynard, Mass. 01754.

The Syncomp Micro/1 Computer System designed for the architectural/engineering environment is described in a new 12-page brochure. Write: Synergistic Computer Systems, Inc., 2736 W. Orangethorpe Ave., Fullerton, Calif. 92633.

A product brochure describing the ITT 245 Cryptel Electronic Message Scrambler can be obtained from the Cryptel Marketing Manager, ITT Data Equipment and Systems Division, Fast Union Ave., East Rutherford, N.J. 07073.

A bulletin on data systems forecasting that highlights methods of corporate planning through DP systems is available from the Data Systems Division of A.O. Smith Corp., 210 West Capitol Dr., Milwaukee, Wis., 53212.

A four-page brochure is available giving specifications and a description of the Model 100 Microfiche Computer Picture Terminal. For a copy write: Computer Pictures, 17362 Napa St., Northridge, Calif. 91324.

General Electric's Digitel data communication products for 1971 are detailed in a 12-page catalogue. Write: General Electric Data Network Operation, Section P, P.O. Box 4197, Lynchburg, Va. 24502.

The complete line of DP supplies available from Columbia Ribbon & Carbon Manufacturing is covered in a 12-page brochure. Contact: Columbia Ribbon & Carbon Manufacturing Co., Inc., Herbbill Road., Glen Cove, N.Y.

The complete system of Courier CRT terminals and hard-copy printers, which are IBM 360-compatible, are detailed in a new illustrated brochure. Write: Courier Terminal Systems, Inc., 2202 East University Dr., Phoenix, Ariz. 85034.

A brochure entitled "Need Maximum Versatility in a Small Computer?" describes and gives specifications for the basic Systems 810B. Write: Systems Engineering Laboratories, Inc., Communications Dept., 6901 West Sunrise Blvd., Fort Lauderdale, Fla. 33313.

Teletype 37 data terminals and their components are described in a 28-page booklet. Contact: Teletype Corp., 5555 Touhy Ave., Skokie, Ill. 60076.

Tabtran, a software service package that translates specially formatted decision tables into Cobol or Fortran source language, is explained in a booklet from Westinghouse. For a copy write: Westinghouse TeleComputer Systems Corp., 2040 Ardmore Blvd., Pittsburgh, Pa., 15230.

A new brochure describing a 200 in./sec tape head is available from the Systematics/Magne-Head Division, General Instrument Corp., 13040 South Cerise Ave., Hawthorne, Calif., 90250.

Rollins Communications, Inc. has announced the availability of a four-page brochure detailing the telecommunications services provided by the company. Write: Rollins International, Inc., Public Relations Dept., P.O. Box 1791, Wilmington, Del., 19899.

A line of 11 technical manuals covering solid-state and electron-tube devices and applications is described in a new two-page circular available from RCA Commercial Engineering, Harrison, N.J., 07029.

A description of the Varian 620/L minicomputer is contained in an eight-page brochure. Write: Marketing Communications, Varian Data Machines 2722 Michelson Drive, Irvine, Calif., 92664.

A brochure detailing the BR-700 Information System is available upon request from Electronic Systems Division, The Bunker-Ramo Corp., 31717 La Tienda Drive, Westlake Village, Calif., 91361.

Alcoswitch is offering a catalog featuring its line of miniature electronic switches and keyboard assemblies. Write: Alcoswitch, Division of Alco Electronic Products, Inc., P.O. Box 1348, Lawrence, Mass., 01842.

Computer Mechanisms Corp.'s full line of tape readers is described in a new brochure available from the company at 493 Washington Ave., Carlstadt, N.J., 07072.

The Proprietary Software Division of Applied Data Research, Inc. has published the first issue of the Metacobol Technical Bulletin. Write: Proprietary Software Division, Applied Data Research, Inc., Rte. 206 Center, Princeton, N.J., 08540.

An illustrated two-page product sheet describing Kybe's Tape Management System (TMS) is available from Kybe Corp., 132 Calvary St., Waltham, Mass., 02154.

The Model 999 IC Tester is described in a new bulletin from Beckman Instruments, Inc., Technical Information Section, Electronic Instruments Division, 3900 N. River Road, Schiller Park, Ill., 60176.

An illustrated data sheet describing the application of the Corning 904 interactive graphic display terminal to electronic circuit analysis has been published by Corning Data Systems, 3900 Electronics Drive, Raleigh, N.C., 27602.

The Raytheon Semiconductor family of Ray 111 transistor logic integrated circuits is detailed in a 68-page handbook from Raytheon Semiconductor, 350 Ellis St., Mountain View, Calif., 94040.

A technical bulletin, "Small Computer Automated Testing Facilities," which reviews a methodology for obtaining information on how electronic equipment functions in various environments, is available from Computer Sciences Corp., 9841 Airport Blvd., Los Angeles, Calif., 90045.

Random Notes

'Panvalet' Library System Back-Up, Control Improved

OAK BROOK, Ill. – Panvalet V, a newly released version of the direct access library system, incorporates many new features to provide greater security, better back-up and better control of source and object programs, according to Pansophic Systems Inc.

The program operates in both DOS and OS/360 using 2311, 2314 and 2321 direct access storage devices. Panvalet uses compression techniques that permit the storage of more than one million card images on a single 2314 pack, the company said from 1121 W. 22 St., 60521.

ADR's 'Metacobol' Extended To Aid Conversion Problems

PRINCETON, N.J. – Version 3 of the Metacobol source program generator from Applied Dete Research is said to give the user more flexibility and faster operation with less core. Macros are available to aid conversion from one form of Cobol to another.

Other changes have extended the user's control of the files created by the test-dete generator, and simplified his use of the run-time debugging aid. ADR is at the Route 206 Center, 08540.

Programs on Cassettes Copied For Legitimate Owners by ITC

MOUNTAIN VIEW, Calif. – Users with multiple minicomputers or programmable calculators that can be controlled by programs stored on cassettes can have those programs copied by Information Terminels Corp. (ITC).

ITC limits the service to those users who can verify their ownership of the programs they wish copied. Minimum orders for as few as five duplicates of programs will be accepted, the company said from 1160 Terra Belle Ave., 94040.

IBM Plans Better MICR Support

WHITE PLAINS, N.Y. – Banks may be able to reduce errors and improve the efficiency of their MICR handling activities with the Check Processing Control System, now under development at IBM.

Scheduled to be available in Oct. 1972, CPCS is expected to establish a deta base of all MICR entries and handle pass-to-pess control so that detailed entry lists can be eliminated. It will operate under OS/360 in 256K bytes of core, and will lease for $1,100/mo.

Bank Tests T/S Financial Planning

NEW YORK – A time-shared financial planning service for banks, based primarily on one program to analyze historical deta and another to forecast future growth patterns, is being test marketed on the GE network, in Ohio, West Virginia and Michigan by Chemical Bank.

DEC Ties PDP-12 to Photometer

MAYNARD, Mass. – DEC has coupled a PDP-12 with a scanning microscope photometer from Carl Zeiss and the resulting unit is said to be able to measure and indicate numerically an optical density range from zero tp 1.75 with en ecuracy of 0.01.

Key to the use of the device is the Taranomic Intra Cellelar Analytical System (Ticas) software for the PDP-12. With Ticar, individuel cells can be identified end classified.

Fast DOS Assembler Loses IBM Support

By Don Leavitt
CW Staff Writer

WHITE PLAINS, N.Y. – IBM has formally notified users of DOS Assembler F that the package will not be supported after Nov. 1.

As a result, users will be faced with the choice of the unsupported but fairly fast Assembler F that operates in 44K bytes, or the supported but slow Assembler D that operates in 14K bytes.

Technically the notice told users that Assembler F would be "reclassified" as of the end of October. Currently carrying an "A" classification, the package has free centralized programming support and free Field Engineering (FE) to solve immediate problems. With a "C" classification, the package will have no free support, but users will be able to obtain FE help on an hourly charge basis.

Some users were concerned by the notice, the way it was distributed, and what some believe it indicates. One user told CW that assemblies on the 14K version of Assembler D, which still carries an "A" classification, take two to four times longer than assemblies with Assembler F. In terms of money, he said, it will cost him at least $100 in overtime each month to use the small assembler.

The IBM notice was computer-generated and addressed, in many cases, to the programming staff member charged with maintaining the user's library of IBM manuals. Several DP managers said that a notice of such importance should have been addressed to management. Others noted that installations that start to use Assembler F between now and Nov 1 may not be notified. Normally IBM issues notices on software reclassifications six months prior to the effective date.

Although IBM spokesmen refused to comment on speculation, some users think this reclassification of the major DOS Assembler may mark the beginning of a general DOS phase out. In this view, IBM will announce a new program product 'to replace the entire DOS, at a monthly charge. Since DOS and Assembler F preceded IBM's unbundling, both are now available without charge.

Time for Sale - I

Outside DP Aids Troubled Users

By Don Leavitt
CW Staff Writer

Users buy computer "time for sale" from other EDP installations to cope with program development and production problems that cannot be solved through the use of an in-house computer or a tie-in with a time-sharing network.

If the use of "time for sale," however, can solve some problems, it can create others, and the first-time user who expects to solve his EDP problems has to be careful.

Users go out-of-house for program development work for two basic reasons; their own computer has not yet been delivered and they want to be able to use their system productively as soon as possible after delivery; or their in-house equipment is too full of production runs to allow adequate testing of new projects.

While outside development work is designed to decrease the in-house workload, the time available on outside machines is often limited to third shift or weekends. This can cause problems with a user's normal staff scheduling.

Outside Site

Production work is often taken to an outside site to solve panic situations, such as in-house machine failure, or regular job overload problems.

In those cases, access to an additional computer may be the only way for the user to get the work done. Sometimes the overloads can be anticipated and the fact that the time for sale is in the middle of the night or on a weekend can be handled without much trouble.

Production on a regular basis is done at outside installations by users with problems unrelated to overload by itself. Some users have decided that they cannot justify the cost of an in-house computer, even though they need a data processing capability. Such users do their work on someone else's machine.

Another time-for-sale buyer is one who has an in-house CPU that is too limited to handle a new application. Since his basic machine is adequate for most of his work, he elects to go outside to handle the occasional large job.

GE Has 'Basic 1' for T/S Novice

BETHESDA, Md. – Users whose time-sharing needs are simple enough to be expressed in the Basic Language can access a low-cost "service-within-a-service" called Basic I, on the Mark I service of the GE network.

At the same time, users of the full Mark I service have been given a price break on their monthly minimum although basic monthly charges have not been changed.

Basic I is available on all GE Mark I systems nationwide. With the new service, users can access only the Basic compiler and certain specified applications programs from the GE library. The more popular programs will be available, but these may change from time to time, a spokesman said.

Despite the possible changes in the available library programs, Basic I is a good way for the newcomer to learn time-sharing, GE said, since the interactive language can guide the user.

Library and user-developed programs on the Basic I service can be used on the full Mark I service which also supports Algol and Fortran II.

Basic I service is $5.75/hr for connect time and three cents per "computer resource unit," with a minimum monthly charge of $25.

The full Mark I service is priced at $8.50/hr for connect time and five cents per CRU. The minimum monthly charge has been reduced from $100 to $25, GE said.

Let Your CPU Do the Collating With 'Stencil' Printing Software

PHILADELPHIA – Stencil is a parameter-driven "universal printing routine" available for DOS/360 users from Data Systems Auditors Inc. It accepts card, tape or disk input and produces output that can be formatted for such diverse uses as letter writing, labels, multicolumn lists and cards in precollated sequence.

Self-relocating and operating in as little as 10K of core, Stencil is said to handle packed data, to edit packed and unpacked data and to provide for upper and lower case printing. Output may be directly to a line printer or spooled to a disk since space control characters are generated automatically.

The Stencil program is divided into four phases. The first reads, checks and lists the parameter cards, and produces any diagnostic messages. The second phase generates "set-up" patterns so that the user can check the alignment of preprinted forms.

The optional third phase is executed only if a format of "north/south" printing is specified. This phase properly distributes the input file over one, two or three work files so that direct printing can occur from each segment of the file. Printing is done in phase four.

Stencil allows the user to control the actual printing through a series of commands, including one that inserts alphanumeric phrases to build up the text of a form letter.

Stencil operates in a minimum of 10K bytes, under DOS/360, but can utilize as much as 512K bytes. A disk drive is required but a line printer is optional since the output can be spooled. The package costs $2,400 for a three-year lease from Data Systems Auditors at 325 Chestnut St., 19106.

Comress Combination

'Dbal,' 'Amigos' Manage OS/360 Data Bases

ROCKVILLE, Md. – OS/360 users attempting to consolidate many application files into a single data base for use with separate applications programs can consider a new Data Base Access Language (Dbal) from Comress.

A data base differs from conventional files in that records consist of root and dependent segments, and the dependent segments exist only when required.

Because of the dependence of most segments on others, accessing of the data is often extremely slow, Comress said.

Dbal provides an "input/output control system" for a data base so that the user must issue only a CALL to access a record when working with Cobol, PL/1, Fortran or BAL application.

Divided into Load Mode and Access Mode, there are 16 Dbal commands that can be issued as part of the CALL. But a given data base may not be used in both modes at the same time.

Dbal uses another Comress-developed program, Amigos, as the access method, replacing IBM's Indexed Sequence Access Method (Isam). Amigos is said to provide not only easier coding than Isam, but also much faster retrieval of data.

While similar in purpose to the Data Language/I (DL/I) part of IBM's Information Management System (IMS S/360) shows the function to be performed and the Error Routine entry point in the CALL. Dbal uses one pointer to the argument list and allows the user to define nonkey field arguments at execute time.

Unlike DL/I, Dbal does not require the equivalents of a DSB or a PSB library. Therefore, preparatory runs are not required prior to creating or accessing data bases, Comress said.

Dbal and the access method, Amigos, are available as a package for not more than $40,000. Users who already have Amigos can purchase Dbal separately for about $25,000, from 2 Research Court, 20850.

'Var66' Aids Varian User

NEW YORK – Users of Varian 620 and 622 minicomputers can keep their systems free for production work by assembling programs "off-line" on a CDC 6600 or a Univac 1108, with the Var66 Assembler System from Dubner Computer Systems Inc.

The Var66 Assembler System is designed to use the power and flexibility of high-speed, large-scale CPUs while meeting all the requirements previously handled by the Varian 620i Assembler. Debugging of the programs assembled under Var66 has to be done on the 620, Dubner said, since the new package does not provide for testing of Varian programs on the CDC or Univac CPUs.

The Dubner cross-assembler stays within the language capabilities of the Varian assembler, so the user is not forced to continue utilizing the host machine for all reassemblies.

In addition the Var66 system provides several special features which Dubner said are not available on other currently available "off-line" assemblers. Among these are automatic overlay processing with a common symbol table, and the generation of cross-reference listings. Assembler time is said to be reduced by the use of random file techniques in the generation of the OP code table and the symbol table. The new Varian 620/f instruction set is supported by Var66, Dubner added.

Written in Fortran IV, Var66 is available in two packages for use on either of the host machines, the CDC 6600 or the Univac 1108. Purchase price is approximately $4,000. Lease terms are about $200/mo. Dubner is at 572 Madison Ave., 10022.

Fixed Amount Bills Generated by 'FAB'

ARLINGTON, Mass. – Banks and other firms involved in the rental and leasing of real property or capital equipment can handle much of their billing, collection and accounting with the Fixed Amount Billing (FAB) system from PHI Computer Services Inc.

Developed jointly by PHI and the Chase Manhattan Bank, FAB can be used to produce bills for fixed amount payments. It can also analyze income, calculate disbursements and handle rental security accounting, a spokesman said.

Operating statements and financial reports are generated by FAB, and labels can be printed for volume mailings. A "lock box" capability is also part of the system, PHI said, to allow users to act as collection points for multistate clients.

Three Basic Modules

The system is divided into three basic modules: billing and report writing; disbursements, including accounts-payable processing; and operating statement generation.

Written in Cobol, FAB has been implemented on an IBM 360 using approximately 90K bytes of core under OS. Development of the modifications required for DOS/360 are expected to be available later.

The entire FAB system is priced at $25,000; the modules are also available separately, the spokesman said. PHI is at 800 Massachusetts Av., 02174.

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Spooler Packages Could Help Put Off Upgrade of Hardware

By Don Leavitt
CW Staff Writer

Installations using IBM DOS/360 with I/O bound programs often can forestall a hardware upgrade by selecting one of the currently available spooler packages. But it may take some effort to decide which spooler is most suitable.

"Spooooling" generally refers to the use of a disk as an intermediate storage device, between an executing application program and the unit record peripherals, card reader, punch and printer. By setting up a high-speed storage point, spoolers allow programs to operate at their best speeds, no longer tied to the slow mechanical speeds of the peripherals.

There are two basic types of spoolers. Each brings input into a disk drive for accessing by the using program.

One pattern shifts all output to the disk, and produces no printed reports or punched cards until the application program has completed its run. The output is then generated under utility-type control, shifting data from disk to printer and/or punch as appropriate.

The other type uses buffer areas in core to store as many output records as possible, and moves only the excess records to disk. The buffers are used so that records can be shifted to the output devices as soon as they become available, even while the program is running. Under this plan, the disk stored records are retrieved and passed to the output device as soon as the core buffers are emptied.

The first type probably allows the fastest execution time but requires time later for the production of the actual output records on cards or printer. Although this is usually overlapped with the execution of the next application program in the job stream, it probably results in some delay in printing compared with a full on-line operation.

The advantage lies in the fact that files other than the I/O are produced and available for following runs faster than they would be if they had been produced during on-line printing or punching.

Some of the spoolers require a dedicated partition and use of IBM's Multiprogramming Support under DOS/360, a cost that can't be measured easily. With IBM's Type III package, Power, for example, an 18K partition is needed, and the user has only two partitions left for his application programs.

At least one of the spoolers, 'Asap' from Universal Software, resides outside of the partitions and does not require use of the Multiprogramming Support. Grasp uses a partition, but it can be shared with the user's teleprocessing program, or routines can be 'attached' to run in the same partition.

A package that includes, but expands on the concept of spooling, PowerPak from Computer General, uses the Power coding spooling. Beyond that it controls I/O for tapes and, apparently, programs as well. It requires 9K bytes of memory and buffers beyond the 18K required by Power.

Package	Developer (Vendor)	Core Requirements: Logic	Core Requirements: Buffer	Output Process Mode	Cost ($)	Partition	Remarks
Grasp	Software Design Inc.	4K (plus 2K for each device)	Yes	Asynchronous but overlaps with application program	7,500	Yes	Package can be relocated in either F1 or F2. User routines can be attached to run in Grasp's partition. T/P program may share Grasp's partition
Asap	Universal Software	2.5K	Yes		3,500	No	Requires IBM's multiprocessing support
DSS	Continental Systems Associates	10K	No		6,900	Yes	
Power	IBM	18K	No	After application program may overlap next program	0	Yes	Type III package
Powerpak	Computer General Corp.	32K Total (including buffer)	Yes		20,000	Yes	Also handles job setup and tape I/O. Uses logic of Power for spooling of unit record I/O.

Chart shows characteristics of several typical spooling packages.

'Medit' System Edits 360 OS, DOS Copy

BROOKLINE, Mass. – General text, letters, advertising copy and catalogs can be edited on-line with an IBM 360 under DOS or OS by using the Medit manuscript editor from Computer Interactive Services Inc. (Cisi). A version of the package based on the DEC PDP-10 is also available, a spokesman said.

The Medit system is word-oriented and uses a simple command language for searching, editing, formatting and printing. It is said to incorporate some of the ideas of ED, a time-sharing editor running at MIT; and DDT, an on-line debugging package.

While there are separate versions for DOS and OS/360 users, the DEC-oriented version operates under any PDP-10 monitor system, Cisi said.

Price of the system is determined by the nature and extent of the application, but should cost about $125/mo on a lease basis, the company said, from 117 Stedman St., 02146.

Pako Opens Center for COM Using 3M F Beam Recorder

MINNEAPOLIS – Users can gain the capabilities of a Computer-Output-Microfilm (COM) system without the expense and planning needed to install an in-house system, through the services of Pako Microfilm.

Located at 1404 Nicottet Ave., Pako uses a Series F Electron Beam Recorder from 3M Co., and provides 24X, 42X and 48X reduction in roll, cartridge or microfiche format. The unit accepts 7- or 9-track magnetic tapes, recorded at any of the standard densities.

Pako has systems programmers available to aid users with program modifications required to shift to COM.

ITT 'Crossbow' Service

Dual 360/65s Support T/S, RJE, CRJE

By Don Leavitt
CW Staff Writer

PARAMUS, N.J.— Users can perform immediate problem solving, data-base inquiry and batch-oriented production work under one time-sharing network, with the Crossbow service from ITT Data Services.

Crossbow provides a choice of interactive time sharing, remote job entry and conversational remote job entry, and the user may select any of these to satisfy the requirements of his application.

The Crossbow service was implemented by linking two IBM 360/65s. The time-sharing CPU running ITT's Reactive Terminal Service (RTS) is in effect the foreground processer while the batch-operating CPU is considered the background processer.

RTS is designed and scheduled to operate with interactive jobs of short duration, such as problem solving or production applications using data bases and files for query/response. Programs for these applications may be developed using the OS/360 compatible compilers for Cobol, Fortran, Basic and Assembler F.

Batch-oriented jobs generally require programs and files which need not be maintained on-line. To satisfy user requirements for this type of operation, ITT's Remote Job Entry using Hasp operates as an adjunct to the batch-oriented OS/360.

Crossbow's Conversational Remote Job Entry enables the user with an RTS time-sharing terminal to access the batch CPU running under OS/360. Under CRJE, the user can maintain batch files and programs during the day, for example, while allowing full batch processing at night.

All of the Crossbow services are being charged at a uniform rate of three cents per computer work unit, a measure based on system resources used. Connect time charges are $10/hr. Storage charges depend on the type of disk unit used.

ITT Data Services is at Route 17 and Garden State Parkway and can be contacted through P.O. Box 402, 07652.

AED Software Allows Nova To Use PL/1

WALTHAM, Mass. – Using its AED software technology, Softech Inc. has developed a cross-compiler, (PL/75), that allows a user to code in PL/1, compile the program on a 360 and use the object code on a Data General Nova or Supernova. The same approach and techniques can be used to produce PL/1-based object code for any available computer, Softech claimed.

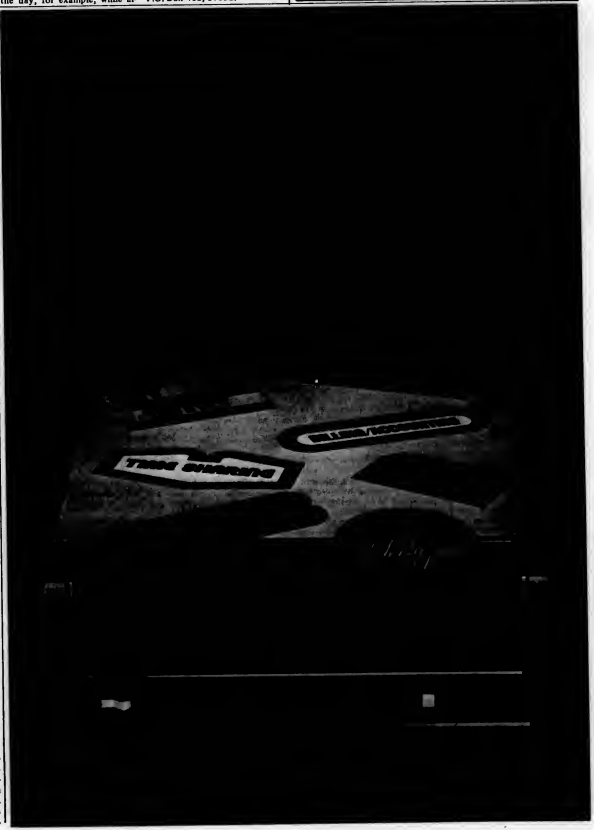
Softech said that it was able to do the job quickly and economically because of the Syntax Definition Facility (SDF) which is part of the AED system programming technology.

In the case of PL/75, the cross-compiler runs on the IBM 360 under OS-MFT, MVT or CP-67/CMS, and produces code for an interpreter operating in the Nova or Supernova.

PL/75 uses a subset of IBM's PL/1 similar to the subset for IBM's TOS or DOS users. It includes the full range of declarations and a complete set of diagnostics, Softech said.

Within the Nova, programs are handled in a manner similar to virtual memory. This permits effective use of core for multiprogramming, and allows programs of any length to be executed, even those that exceed the limits of physical core.

The AED software concepts were developed in a joint Air Force-industry project at MIT. The system, including the facilities such as SDF and the AED-0 language for application programming, is distributed by Softech Inc. for an installation charge of $625 and $200/mo. for the OS/360 user. Softech Inc. is at 391 Totten Pond Road.



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COMPUTER PROTECTION/INSURANCE WORKSHOP

Monday, June 14, 1971, PICK CONGRESS HOTEL—CHICAGO

Produced jointly by the publisher of BUSINESS INSURANCE newsmagazine and the publisher of COMPUTERWORLD newsweekly

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Melvin Bockelman

Data processing manager, Kansas City Police Department, on computer operations and invasions of privacy.

Warren G. Brockmeier

Director-western region risk management department, Ebasco Services Inc., on risk management for computer centers.

Karl W. Fruecht

Corporate vice president, Household Finance Corp., on physical protection for computer installations.

Rolf H. Jensen

Chairman and professor, fire protection engineering department, Illinois Institute of Technology, on computer fire protection.

Gordon M. Paine

Assistant secretary, St. Paul Fire and Marine Insurance Co., on property insurance for computer facilities.

Louis Scoma, Jr.

President, Data Processing Security, Inc., on security for computer facilities.

Michael Verbick

Manager data processing, Playboy Clubs International, on security and protection for computer records.

Herbert T. Walworth

Manager, special technical services section, Kemper Insurance Cos., on protecting computer room employes.

Dr. Robert Wiper

Behaviorel psychologist on the care end feeding of computer room employes.

Fred Zeleny

Chief engineer, westarn regional office, Factory Insurance Assn., on fire protection for computers.

R. C. Bjorklund, T. J. Morton

Moderators. R.C. Bjorklund, editor *Business Insurance,* and T.J. Morton, Midwest bureau chief, Computerworld.

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Bits & Pieces

Telex Alters Lease Policy On 5314 Disk Drive System

TULSA, Okla. – Telex Corp. has changed its lease policy by announcing that orders for new Telex 5314 Disk Systems will be accepted only for three years or longer.

Telex will continue to make the systems available for purchase at its published prices, the company said. Orders for one year firm leases will now be delivered only on an "as-available" basis, Telex said.

1625 Microfilm Reader Features Cartridge Interchangeability

PEEKSKILL, N.Y. – The Model 1625 microfilm reader from the Memory Display Systems division of the Edmaltes Corp. features cartridge interchangeability and easy image rotation. The unit accepts 3M cartridges, Recordak cartridges and 16mm roll microfilm.

A front-panel lever is used to rotate the image 180°. Film advance speed is continuously variable from 1 page/min to 100 ft/22 sec. The 11 by 14 in. screen is illuminated by a quartz-halogen lamp. The 1625 is priced at $770 and available on a 30-day delivery from 200 N. Water St., 10566.

Bunker-Ramo Cuts 2200-N Prices, New Contract Terms Also Offered

TRUMBULL, Conn. – Prices on its 2200-N line of CRT terminals were cut an average of 22% by Bunker-Ramo Corp. Maintenence prices have also been reduced.

Also announced were new contract terms with a two-year lease and an indefinite period contract including 90-day cancellation replacing the current two-, three-, and five-year contracts.

Current users will be able to change to the lower prices and new contract terms on November 1, the company said.

Victor Adds Ledger Card Reader To Series 800 Small-Scale Unit

CHICAGO – Victor Comptometer Corp. has added the Model 720, 30,000 digit/min ledger-card reader to its Series 800 small-scale billing and accounting computers. The cards have a capacity of 1,024 digits each and provide hard copy of each account history, the company said.

The 720 is priced at $4,900 and is available on a 30-day schedule from 3900 N. Rockwell St., 60618.

Memorex Warrants Compatibility Of Data Transcriber Cartridges

SANTA CLARA, Calif. – The Memorex Date Inscriber cartridge from Memorex Corp. is warranted by the company to be compatible with the IBM Model 50 Data Inscriber and Model 2495 Tape Cartridge Reader.

The cartridges feature a flanged inner hub to ensure less tape-wobble and reduce tape edge damage. A tape length indicator on the hub flange is provided. The cartridge is available at a price of $17.50 from 1180 Shulman Ave., 95050.

Texwipe Offers New Catalog

HILLSDALE, N.J. – A catalog describing its line of cleaning products for DP equipment is available from the Texwipe Co. Products to be used with magnetic tape and disk drives, CRTs and other equipment are described. The catalog is available through Box 278, 07642.

Handles 240 char/sec Data

Teletype 38 Offers Upper/Lower Case

By Frank Piasta
CW Staff Writer

SKOKIE, Ill. – Priced at from $100 to $200 more than the earlier Model 33, the Model 38 from Teletype Corp. offers the user upper and lower case and compatibility with the company's 4210 magnetic tape data terminal to achieve higher data throughput.

When combined with the 4210, the 38 can handle transmissions up to 240 char/sec. The normal speed is 10 char/sec. A wide carriage feature allows the Model 38 to handle 14-7/8 in. computer paper.

The low price of the new model may help the company reduce the number of users looking into alternatives to Teletype equipment. Upper and lower case, for example, is offered by many of the compatible replacements.

The Teletype unit will not replace two types of similar terminals, those that are significantly faster and those that are portable.

The high-speed teletypewriter from Memorex, the 1240, prints at selectable speeds of 10, 15, 30 or 60 char/sec. In contrast, the 240 char/sec maximum speed of the Teletype 38, in off-line printing mode, requires the use of an intermediate magnetic tape terminal. The Memorex user, however, pays a rather high price for the increase in speed as prices for the 1240 range from $4,200 to $6,300. The lower figure does not include the 60 char/sec capability, which is priced at $875.

Other 30 char/sec terminals are priced at the same level. The GE Terminet 300 will cost the user from $4,115 to $6,720. The Univac DCT 500 ranges in price from $2,880 in the basic receive-only configuration to the automatic send/receive model at $6,209.

If the price increase to obtain more speed seems high on these units, the cost of a device from Teletype to go beyond 10 char/sec is still higher. The Model 37, capable of 15 char/sec, costs up to $4,000 in ASR configuration.

The Teletype 38 is priced as follows: 38 RO, $700 to $850; 38 KSR, $750 to $925; and 38 ASR, $950 to $1,175. These figures do not include the modem. Delivery is scheduled for the second quarter of 1972.

IBM Small Terminals Expanded, Devices for Bank, Factory Use

WHITE PLAINS, N.Y. – IBM has expanded its line of low-cost special-purpose terminals with the 2798 for use at work stations in industrial environments and the 2730 that reads magnetic-striped credit cards at point-of-sale locations.

The 2798 permits a worker to enter data into the computer system through a typewriter-like keyboard and eight control keys, and receive responses through an alphanumeric display. Messages handled cannot be more than 16 characters in length thereby limiting the unit's usefulness as an entry device. It is designed for use with the 2790 communications system.

A series of 16 lights combined with a user-prepared overlay mask allows the computer to control the operation of the terminal. By means of the removable mask, as many as 48 messages can be transmitted to the operator, IBM said.

The 2798 is equipped with eight function keys that trigger a programmed procedure to be followed by the operator. Eight control keys to enter special information into the system are also provided.

Messages typed by the operator or sent from the computer are shown to the operator on a 16-character gas-panel display. The display consists of a solid block of transparent material with bubbles containing neon with wires to permit illumination. Each bubble corresponds to one dot of a 5 by 7 matrix.

A typical 2790 system, consisting of a controller, 12, 2798s and 30 other devices, including data entry units and printer, will rent for about $4,500/mo, with a purchase price of about $216,000.

The monthly rental for the 2798 will be $90 with a purchase price of $4,320. First shipments will be scheduled for mid-1972, IBM said.

Credit Card Reader

The 2730 Transaction Validation Terminal, which is acoustically coupled to a telephone, is designed to be used at the point-of-sale to clear credit charges through a bank's computer.

To authorize a credit purchase, a clerk places the customer's credit card in the terminal and dials the computer from an ordinary telephone. After the transaction amount is entered through a numeric keyboard, the terminal reads the customer's and merchant's cards and sends the information to a computer. An audio-response system is used to answer the query.

The terminal requires the use of a 2968 receiver-transmission control unit, IBM said. Audio-response would be provided through an IBM 7770 audio response system, the company added.

The 2730 is IBM's first product to use the magnetic-striped card. As many as 40 numeric characters can be used to identify the cardholder.

The magnetic-striped cards and an embossing and encoding service will be available through IBM in the fourth quarter of 1971.

The 2730 is a purchase-only item priced at $515. Initial shipments will begin the second quarter of 1972.

System Maintenance - Part I

Leasing Limits User's Options

By Frank Piasta
CW Staff Writer

Most computer users lease their systems from the manufacturer which places them under certain restrictions when obtaining maintenance.

Most manufacturers specify that they provide maintenance of leased systems.

In such cases, the user has little choice. If he is displeased with the caliber of the technicians, dissatisfied with the promptness of their response to his needs, or unhappy about any other aspect of the care his equipment is getting, he probably has no alternatives other than purchasing the system, going to another manufacturer, or both.

The average DP manager calls the local branch office in the event of a hardware malfunction and reports the trouble. After a length of time the service man arrives and corrects the problem.

The leasing customer has an advantage over the user who owns his own system in that the down-time of his system may represent a direct loss of revenue to the manufacturer. The user is leasing a going system and may not be required to pay for it while it's not working.

The delay in response can be eliminated if the installation is large. A site that represents a sizeable monthly rental and is especially complex can obtain one or more resident technicians.

Mixed-Site Problems

Life can be especially difficult for the adventurous lessor who wants to add independent peripherals to his system. He will probably have to depend on the peripheral manufacturer to service the equipment, as the largest manufacturer will not service any maintaining equipment that is not its own.

Another manufacturer will perform maintenance under a special contract if the device is not competitive with any of its own gear. Still another will keep it running, under a special contract, but at a price that would probably reflect the attitude of a company official, who said his company would rather not undertake the job.

With two sets of maintenance people, two sets of opinions sometimes develop over assignment of responsibility for a system failure. And one veteran of such encounters told CW, it frequently becomes a session of finger pointing. Officially, all of the manufacturers pledge themselves to cooperate with the other side in the detection and isolation of problems.

Moving-Head Disks Added to Nova Line

SOUTHBORO, Mass. – Data General is offering users of its Nova series a 2311-type disk drive, the 4048A.

The availability of a moving-head drive with removable 1.316-type pack allows the user to expand his random access capability at a relatively low cost, the company said.

A disk system consists of a 4046 controller, a 4048 adapter and up to four drives. Two 4-drive systems can be attached to a single computer.

The disk drives run at 2,400 rpm, giving an average latency time of 12.5 msec and an average access time of 42.5 msec.

A pack can store 256 8-bit words in blocks of 256 words for a total of 3,072 Mwords. Data transfer rate is 12.8 μsec/word.

Parallel Seeks

Software governs the controller which in turn communicates with an adapter that controls all disks over a disk bus. Data is transferred to one disk at a time, but all disks can perform seeks simultaneously.

The controller contains a register which allows up to 16 consecutive 256-word sectors to be transferred with one instruction.

The price of the 4048A disk drive is $13,000. The 4046 controller is priced at $4,000 and the 4048 adapter at $6,000. First deliveries will be in June.

Key vs. Card Entry Important

Upward Mobility One Key to Small Systems Selection

By Frank Plasta
CW Staff Writer

The user seeking a small computer system has to make two important decisions: whether he wants a system that depends on a keyboard for entry of data, and whether upward mobility is important to him.

Once these decisions are made, the availability of equipment may surprise him.

The keyboard systems are principally two, the IBM System/3 Model 6 and the Honeywell 58. Price is not a real criterion as both sell for about the same. Language could make the difference, though, with the HIS 58 having a Cobol compiler to make it easier for a user to switch to another system while the System/3 is restricted to RPG II.

In the area of available memory size, the System/3 shows a broader range, from 8K to 32K, while the HIS 58 is limited to either 5K or 10K.

Both systems can handle punched cards, but there is a significant difference – the System/3 has the 96-column cards and only a Data Recorder as a card reader. The HIS 58, on the other hand, offers standard 80-column cards and more conventional card readers rated at 100 or 200 card/min.

Since the principal input device on these systems is a keyboard, the card reading capacity may be less important than on a more conventional computer. The internal speeds of the two systems are quite evenly matched; with the HIS at 1.2 μsec and the IBM at 1.52 μsec.

Analysis

The principal program and data storage device on both is the magnetic disk,with neither system offering magnetic tapes.

A drawback to the IBM system is the lack of paper tape equipment which is provided on the HIS machine. This I/O medium has proved to be popular with the communications-oriented user that the two systems are designed to attract.

The user who wants a more automated small computer has a wider choice. The cycle times vary from the IBM System/3 Model 10 to the .8 μsec internal speed of the Century 50.

Storage capacity can be used as an indication of power, with the Model 10 being the largest with a maximum of 48K bytes and the NCR 50 and the Univac 9200 both offering 32K maximum memories.

All of the systems offer disk facilities as well as card I/O, although the System/3's 96-column card could result in compatibility problems. The S/3 Model 10 also lacks paper tape equipment.

The Univac 9200 offers the widest selection of peripherals, including magnetic tape drives.

As far as pricing is concerned, the systems seem to be quite evenly matched, with only the NCR having a significantly higher entry cost.

Both the Univac and NCR units are software compatible with more powerful models in the same family, even using common peripherals. This allows future upgrades with minimal problems.

Marshall M2900 Disk Now Offered to 360/25 Users

SAN MARINO, Calif. – 360/25 users will now be able to take advantage of the M2900 disk storage system from Marshall Data Systems, according to the company. The system, which the company describes as "featuring double the storage capacity at 148% more bytes per dollar than the IBM 2314," was previously announced for the 360/30 and up.

Bits & Pieces

Schools Offered New Plan For Buying HP Systems

PALO ALTO, Calif. – A system purchase plan with monthly payments as low as 2.29% of the purchase price is being offered by Hewlett-Packard to schools, colleges and universities.

Under the plan, Hewlett-Peckard said, any educational institution may buy HP systems over payment periods ranging from 24 to 48 months. A school can buy a $100,000 system for $2,292/mo for 48 months, the company said, with no "balloon" payment at the end.

Variable Resolution Featured In Fast Drum Data Digitizer

STATE COLLEGE, Pa. – Visicon, Inc. has announced the GC-3, an improved version of its drum style automatic data digitizer that will digitize an 11 in. by 17 in document in 58 seconds. The device can be used with graphs, maps and drawings. Resolution is easily changed from 100 line/in. to 200 line/in., the company said. Output can be hardwired to a variety of computers. An off-line version with magnetic tape output is also available. Prices start at $7,000 and delivery takes 30 days from P.O. Box 1008, 16801.

Post Office Makes Keys Quickly Using Mini-Controlled System

WASHINGTON, D.C. – A system that automatically cuts, stamps, inspects and packages postal lock box keys for the U.S. Postal Service, designed by Comstock & Wescott, Inc. of Cambridge, Mass., is controlled by a 4K DEC PDP-8/S minicomputer.

Copier Handles 16mm-35mm Film

VAN NUYS, Calif. – The XD-1 diazo film duplicator and the XT-1 thermal film duplicator, from Extak Microsystems, can handle all common sizes of microfilm from 16mm through 105mm.

Both units have speed ranges from 15 to 150 ft/min and feature front loading, flat exposure stations, vacuum buffer tension controls, and automatic counters. Priced at about $15,000, the units will be available in June from 15424 Cabrito Road, 91406.

Raytheon 704 System Is Mini-Based; Disks, Tapes, Printer Added to 700

NORWOOD, Mass. – The Raytheon 704 Data Acquisition and Control System, built around a 704 computer, is designed to perform a variety of data gathering, logging, processing, storage and control functions in applications such as industrial and scientific testing and research.

Raytheon Data Systems has also added several peripheral devices to the 700 series, including fixed and movable head disk drives, magnetic tape transports and a line printer.

The 704 system includes a 16-bit word 704 general-purpose computer; 32-channel multiplexed, 12-bit A/D converter; I/O control for 32 discrete signals; up to four tape transports and controller and Teletype ASR-33 for operator/system interface.

The movable-head disk storage system provides direct access to up to 104 million bytes of data. The system accommodates from one to four 2316-type disk packs. Maximum latency time is 25 msec, with an average access time of 32 msec.

A low-cost 96 Kbyte disk drive has also been added to the 700 series. The fixed-head device has 16 tracks. Average access time is 16.7 msec and the transfer rate is 187K word/sec.

The tape transports added to the 700 line use 10-1/2 in. reels and have a tape speed of 37.5 in./sec.

Also added is a free-standing, desk-top line printer with a capacity of 356, 80-column line/min.

A typical 704 Data Acquisition and Control System, including 4K memory, console, TTY control and one level of Priority Interrupt will cost $8,000, with 4K memory increments priced at $3,500.

The moving head disk is priced at $15,000 for the controller and $20,000 per drive. The fixed-head disk will cost $5,000 for the controller and $11,500 for each drive. The magnetic tape drive controller carries a price tag of $5,500 and each drive will cost $5,300. The cost of the printer is $12,000.

Raytheon Data Systems Co. is on Route 1.

Comcet Replaces IBM 2701

ST. PAUL, Minn. – The Comten 3670, designed to be a price-competitive replacement for IBM 2701, 2702 and 2703 control units, offers features unavailable with the IBM devices.

The 3670, built by Comcet, Inc., can be connected to as many as four 360 or 370 systems simultaneously. In addition, the 3670 can handle a larger number of communications lines, up to 212, than any of the 2701-2-3 controllers, Comcet said. The controller, in multiprocessor applications, can be used to handle terminal initiated routing, allowing a terminal to address any connected processor.

The 3670 is plug compatible with the IBM systems and is software transparent. Since the unit is firmware programmed, it can be adapted to most terminals, the company said. A subset of 360 machine language is used. The basic unit is equipped with 16K bytes of firmware, expandable in 8K segments to a maximum of 64K bytes.

The 3670 can handle synchronous, asynchronous, BSC and STR procedures. Maximum throughput is rated at 15,000 char/sec.

The basic 3670 is priced at $63,000 and is available on a five-year lease at $1,715/mo, including maintenance. First deliveries will be made during the first quarter of 1972 from 1950 West County Road B-2, 55113.

Burroughs Offers Low-Cost Terminal For Credit Cards

DETROIT – A low-cost point-of-sale credit authorization terminal from Burroughs can handle as many as six different credit cards.

The device, called the TU300, can accept input from either conventional or magnetic-striped cards and transmit it to institutions in the credit authorization and electronic funds transfer fields.

Burroughs also announced that it will provide credit authorization software for the B3500 and B4500 data processing systems.

Designed to be used at point-of-sale locations, the terminals are linked by telephone lines to computerized credit card data centers for quick credit authorization.

The use of the terminal, Burroughs said, will help the centers minimize their losses by increasing protection against fraudulent card use.

Once an operator has entered the transaction amount and inserted the credit card, the account number is read from the magnetic stripe, or entered manually from the keyboard. The terminal then transmits the account number, merchant number and transaction amount to the computer.

On approved transactions, the required information is imprinted on the sales ticket.

On referred transactions, a light instructs the operator to review the account. On denials the credit card and sales slip are ejected without imprinting.

The TU300 will be leased to credit card companies on a sliding scale as additional companies participate. The cost per terminal will decrease from $40 to $15/mo.

The terminals include a ten-key keyboard, seven functional control keys and six data center access keys, buffered input and output messages, and six digit amount display. Deliveries are scheduled for the fourth quarter of 1972.

Improved Microfilm Reader Eliminates Film Jamming

SAN FRANCISCO – Improvements made to the Northstar I cartridge microfilm reader from Reproduction Systems, including a motor tachometer, electric clutches and a constant drive mechanism, are said to assure smooth film movement.

The reader also features a 14 in. by 14 in. screen, 24X lens, 360° optical rotation, quartz halogen lamp changeable film gate, and an odometer index capability. It can use 3M-type cartridges. The terminal is priced at $870 on a two to four week delivery schedule from 1 California St., 94111.

For Bell Private Lines

New 'Arrangements' Installed

By Ronald A. Frank
CW Technical News Editor

NEW YORK – Although some data users feel the move is unwarranted, AT&T operating companies have begun installing "Connecting Arrangements" (CA) at sites which have non-Bell equipment tied to interstate voice-grade private lines. Until now, AT&T required connecting DAA devices only on non-private network lines.

The exact configuration of a CA apparently will depend upon many variables. According to AT&T, private line users will have CAs installed on a "selected" basis, but in all cases the modifications will be done free of charge. In addition the CA installation will be transparent to normal operations meaning that the user's transmission and/or equipment will not be adversely affected.

Although the CAs will not be required on private lines until July 1, AT&T apparently feels that the modifications can be installed before then. Anticipating that its tariff proposal covering the CA installations will be approved, the carrier is already making the necessary modifications at some user sites. According to an AT&T spokesman, Bell views the CAs as a service offering that will have to be installed at sites when the tariff takes effect.

The FCC staff, however, appears to disagree. A spokesman for the Common Carrier Bureau told CW that the changes proposed by AT&T "have not yet been resolved."

He added that some users had written to the commission to object to the private line protection proposal and said it is possible that the tariff "might be suspended." But the FCC has not yet acted on the matter, he said. If the commission takes no action the tariff would automatically go into effect July 1.

The private line CA was first proposed by AT&T in an FCC tariff filing in March, 1969 to be effective July, 1970. But last year before the effective date, the carrier asked for a one-year extension because it was unable to implement the necessary connecting arrangements. The FCC agreed to postpone the date to July of this year.

The private line CA will differ from the dial-up line Data Access Arrangement (DAA) in several ways. First the CA apparently will not be a separate device but consist of permanent "fixes" applied directly to private lines. One type of CA could be a modified version of the 1000B DAA unit, according to an AT&T spokesman. Second, Bell apparently will not issue specifications on the various CA configurations. This could be a problem to users planning new private line facilities if exact CA requirements are not published.

Technically, the CA will be less complicated than the DAA device. The CA will primarily provide overload protection to the private line user. The CA installations will protect users against outside interference as well as protect the phone network from any harm that may be caused by non-Bell equipment, AT&T said.

One aspect of AT&T's CA procedures is causing some concern to users. Apparently at sites where Bell is planning CA modifications, users are being requested to provide a complete list of noncarrier equipment being used, together with their operating characteristics. One user told CW that he has refused to give this information to the local phone company.

Although Bell is proceeding with CA installations, private line users apparently are not obligated to accept such modifications until the proposed tariff change takes effect. An AT&T spokesman admitted to CW that users can refuse to accept a CA modification until the tariff takes effect. But since Bell is not charging for the CA installation, they will probably not object, he said.

One user told CW that AT&T had for years permitted the use of non-Bell equipment on private lines without any type of DAA device. "Now we suddenly need an 'arrangement' to protect us from harm that hasn't occurred previously," he said.

COMPUTERWORLD communications

Multiplexer Support Key To First Datacom Usage

MEMPHIS, Tenn. – Western Union's Datacom bulk data-transmission service which includes multiplexer support is both reliable and relatively inexpensive, according to American Express (AE) which is converting its nationwide reservations system to the WU service. AE was the first Datacom user, according to WU.

Datacom was initiated last October as a low-speed, 150 bit/sec service between 45 U.S. cities. It utilizes channel subdivision techniques to increase the information-carrying capabilities and thus reduce the cost of transmission for the bulk user.

Under Datacom, the user can lease multiplexing equipment and voice-grade facilities from WU. All multiplexing equipment is maintained by WU and is physically located in WU operating centers. Although joint use is permitted, an authorized user is limited to a compnay in the same line of business.

AE has two IBM 360/40s with 2703 front-end control units located here. Multidrop lines, with about 10 locations per line, service some 800 U.S. locations in a continual polled mode, the firm said.

Previously the AE network had been structured around company-owned multiplexers in Dallas, Phoenix, San Francisco, Chicago and New York. Channels were leased from AT&T.

The portion of the network already converted to Datacom uses IBM 2970 reservation terminals or specially modified Model 32 ASR teletypewriters.

Less Downtime

There has been less downtime under Datacom and when there has been trouble the WU people "have been very good to work with," an AE spokesman said. He added, however, that the great advantage has been that maintenance is not divided as it was when the company was responsible for part of the system, and AT&T handled the rest.

Converting to Datacom is expected to provide economic advantages, principally because the company will be relieved of the expense of maintaining the multiplexers. That more than offsets the cost of leased lines to the Datacom cities and the Datacom service itself, a spokesman said.

Bell Increases Will Continue Throughout Decade, NRMA Told

By Alan Drattell
CW Washington Bureau

ARLINGTON, Va. – Users face continuing periodic rate increases from the Bell System in the decade ahead, a consultant told data users attending the spring telecommunications seminar sponsored here recently by the National Retail Merchants Association (NRMA).

D.E. Winslow, a Bethesda, Md., consultant in communications matters for various carriers, NRMA state associations and other intervenors in state and federal rate cases, told the meeting that "if telephone company forecasts come anywhere close to being accurate, the decade from 1970 to 1980 will be one of the most intense periods of capital investment in communications in our nation's history.

"The next decade," he warned, "will see not only an increasing number of requests for rate increases coming every two to five years, but a shift in the basis for claiming higher rates."

The flat rate was the big push in the two previous decades, he said, and predicted the following will occur in the years ahead:

"Breakdown of dialing areas in Watts-type zones with a different rate applied to each zone depending on distance from caller zone.

"Time impositions through higher rates for calling during peak load periods.

"The introduction of volume rates for data usage on the basis of the throughput – and perhaps even some extra message charges when voice conversations go into extended calling times.

"The key to much of what is going to happen," he added, "may come from the effects of liberalizing the foreign attachments rule, so privately owned equipment can be used on telephone company lines. If they lose the bountiful harvest they reap on monthly charges for equipment, telephone companies will have to recoup such losses with increased revenues earned on charges for line usage."

The telephone companies, Winslow said, "cannot tell you how much it costs them to supply service to you as business users. Yet they are certain that the rates charged to business should be higher than residential due to something called 'value of service pricing.' He described this method as applied by the Bell System as being all that the traffic will bear.

And he added: "In some 11 years of experience in state and federal jurisdictions, I have never seen a telephone company case which contained the necessary data or studies which would adequately justify the large differences in rates charged to different groups of users for identical service on the basis of cost facts."

Winslow singled out Bell's Information Service Access Line (Isal) tariff, which he said "would impose a rate of four to six times the existing level for line haul charges on any line attaching a remote terminal to a computer."

He said such rates might force retailers with point-of-sale terminals, for example, "to go to an entire private in-house system or might preclude them completely from utilizing such services for internal operations unless they are willing to pay dramatically increased rates for Bell System lines."

He added that Bell System capital inputs are currently about $7.5 billion annually and will grow to $10 billion a year within two or three years.

MCI Nears Operation

User Plans CPU Input With Facsimile Transmissions

By Don Leavitt
CW Staff Writer

CHICAGO – When the first user begins transmissions on the Microwave Communications Inc. (MCI) new specialized carrier link in a few weeks he will be testing an innovative input system to his CPU.

Continental Can Co. plans to use a channel on the first MCI link between Chicago and St. Louis to collect sales information from 12 remote locations for processing at its DP center here.

The CCC/MCI operation will operate as follows:

Acoustically coupled facsimile transmission devices will be installed in CCC offices in the Chicago and St. Louis areas. As orders are received, information is to be typed or hand-written on specially designed forms with a "grid format," and fed into the facsimile units.

The stream of analog impulses generated as each facsimile device scans the document grid is stored on tape cassettes at each site. The cassettes will be polled throughout the day by a special terminal being developed by CCC for the purpose. Converted to digital form by data sets, the polled data is stored on standard magnetic tapes to be used as input to CCC's IBM 360/40 in Chicago.

Software is being developed to interpret the digitized results of the facsimile transmissions and convert the data to formats compatible with the CPU.

With this approach, CCC will be able to use the relatively inexpensive facsimile devices in place of both more costly document scanners and modems.

One-way service is tailor-made for the CCC data collection, and MCI will provide this option. The established carriers offer only two-way service, an MCI spokesman told CW. In addition, the MCI service will allow CCC to use a 2 Kc channel.

With Bell service, the user would be limited to a 3000 series channel which provides a minimum rated bandwidth of 4 Kc.

A CCC spokesman estimated that the company will be able to save 80% of the cost of doing the same data collection job by more conventional means.

The MCI link will mark the initial operation in what may ultimately be a nationwide network of specialized carriers offering services to data users in competition with Bell.

Canadian Data Use Grows

LONDON, Ontario – Data transmission may represent almost 20% of Bell Canada's activities by 1980 and the carrier expects to be ready for the users, according to Palle Kiar, general manager of Bell's newly organized computer communications operation.

Kiar said his 2,000-man organization will soon relieve the problems data users

A week after the data group was organized the Trans-Canada Telephone System announced plans for a nationwide digital network.

Paralleling the growth of the digital network is the development of a new SP-1 central office from Northern Electric that will permit the passage of digital information without analog conversion, Kiar said.

Data Briefs

Bell Begins Field Testing T2 Digital Transmissions

WILLOW GROVE, Pa. – The T2 digital carrier system, designed to provide high-capacity communications links over distances up to 500 miles, is being tested here by Bell Labs engineers with the cooperation of the Bell Telephone Co. of Pennsylvania.

Scheduled for service next year, the T2 system is said to have four times the capacity of the T1 digital carrier which has been in use in end around major cities since 1962.

FCC OKs NYC Microwave Link But May Look Further at PCM

WASHINGTON, D.C. – The Federal Communications Commission has granted the New York Telephone Co. a one-year permit for a microwave link between Brooklyn and Statan Island, but the commission has some reservations about the project which will use pulse code modulation (PCM) techniques. NY Bell plans to use Japanese transmission equipment on the link.

Planned for voice transmission, the link would provide more efficient radio spectrum utilization if used for digital transmission, the FCC staff said. An FCC inquiry into the use of PCM for voice transmission is apparently being considered.

Network Audit Service Reviews Use of Communications Systems

CHERRY HILL, N.J. – Users can gain a fixed fee review of the cost-effectiveness of their communications systems through the Network Audit Service from Berglund Associates. The service is described as an intensive study of the user's entire system.

Network Audit is not an original design service, the company said, but rather an analysis of how a user's system can be improved, in the light of operating experience. Berglund Associates is at 1060 Kings Highway, North, 08034.

Prentice Unit Holds 40 Modems

PALO ALTO, Calif. – The P-1000 Data Set Station from Prentice Electronics Corp. is said to house up to 40 Bell 103 type modem modules or as many as 64 IBM compatible line adapters.

When ordered as replacements for the Bell System 103E5 cabinets, the P-1000 will accommodate internally the necessary automatic Data Access Arrangement (DAA) supplied by the telephone company. Prentice is at 795 San Antonio Road, 94303.

College Gets 'New' Computers From Ancient Missile Systems

SIOUX FALLS, S.D. – Because of the relentlessness of progress, Augustana College departments in natural sciences are the thankful recipients of nearly $500,000 in computer equipment.

It seems that the U.S. Department of Defense decided to update its missile system last May and one of the country's major weapons, the Minuteman I ICBM, was put out to pasture, superseded by the controversial Mirv missile systems.

Dr. J.D. Thompson of the department of physics and biology professor Larry Tieszen made a formal application through the National Science Foundation for two of the digital computers which were being dismantled with each replaced Minuteman. A scientific trade journal first published notice of the computers.

The computers are located in the missile's nose and are built around a sensitive gyroscope which controls the flight attitude of the fired missile.

One computer, which has already been received by Augustana and another which is expected shortly, were built by the North American Aviation Corp. at a cost of $234,000 each.

Particularly adapted to process control, the computer can monitor 43 input lines simultaneously, control process application and respond to whatever process it was set to do.

Because no instructions came along with the machinery, Lowell Grev, a senior physics and mathematics major, will test the computer and make it operational as part of an independent study project during the remainder of this year.

Grev will build a control panel which will have the capacity to "communicate" with the computer.

The physics, biology, chemistry and psychology departments all are eagerly eying the computers for planned applications.

Ultimately at least 1,000 of the computers will become available for constructive uses. Thus far only four of the computers are operating in U.S. colleges and universities.

DP to Replace Card Catalogs, Yale Library Study Says

NEW HAVEN, Conn. – The Yale University Library has completed a one-year study of how its eight million card catalog is used, and affirmed the value of computers in libraries.

"Computer methods will eventually replace card catalogs in large libraries, but it is highly unlikely that any single computer program will seriously replace the human ability to find specific books or documents."

Ben-Ami Lipetz, an expert on library techniques, who heads the Yale Library Research Department, also said: "There is reason to believe that combinations of computer methods can be developed that will approach or surpass human performance.

"New computer methods could be devised to consider the data from many viewpoints at once, just as human catalog users do."

Lipetz bases his opinions on findings from the survey of the Yale Library's card catalog use. Housed in Sterling Memorial Library, the catalog contains about eight million cards in 7,000 drawers; it is the central file for all 60 campus libraries.

The Yale Library is the fourth largest book repository in the nation. With more than 5.8 million volumes, it is exceeded in size only by the Library of Congress, the New York Public Library and the Harvard Library.

Lipetz sees "promise in the idea of using automated techniques for catalog construction." But he regards it as "unrealistic to expect impressive retrieval performance from such catalogs if they contain only information copied directly from input documents without some degree of annotation and association, whether human-supplied or computer-supplied."

The survey at Yale was intended to accomplish two goals: possible improvement of existing card catalogs, and identification of ways to computerize catalogs for very large libraries.

COMPUTERWORLD

education

University to Accept Credit From Any CDI

NEW YORK – The New York Institute of Technology (Nyit) and Control Data Corp. have agreed to allow graduates of any Control Data Institute to receive credit toward an Associate or Baccalaureate Degree from Nyit.

The agreement between the two schools is the second major university tie-in by Control Data. A similar pooling of resources applying only to graduates of the the Minneapolis institute was reached with the University of Minnesota [CW, May 5].

Dr. John Hulser, special assistant to the president of Nyit, said: "Students at both institutes will now have even broader avenues of endeavor available to them. This cooperative program will help us better guide their educational and career aspirations toward society's requirements in business, government and the professions."

Credit transfer toward a degree will vary from seven credits to 26 credits depending upon the courses taken at CDI.

Control Data has 27 owned or licensed institutes throughout the country and six international units.

The New York Institute of Technology offers career-oriented degree programs in the modern technologies, science, business, communication arts and fine arts.

NSF Grant

Dartmouth Center to Produce DP Texts

HANOVER, N.H. – A new center for the production of a new mix of college-level educational materials – textbooks with computer program problems and exercises keyed specifically to the texts – has been established at Dartmouth College under a $450,000 National Science Foundation grant.

The funds will provide three-year initiative support for the center, to be called Compute (Computer Oriented Materials for Undergraduate Teaching). The center will be directed by Arthur W. Luehrmann, adjunct professor of physics and inventor of computer plotting devices and codirector of Project Coexist.

Luehrmann said that what appears to be impeding the flow of usable and reliable course materials is the absence of a center to produce and distribute high quality textbooks, monographs, programs, homework exercises and other materials to colleges.

"The goal of Project Compute is to fill this void," he said. "To do so, it will rely on the creative talents of active and sophisticated teachers who are engaged in the development of curricular applications of computing."

The largest portion of the NSF grant will be used to underwrite the work of six to 12 faculty members each summer on the development of computer-oriented materials that can be used in the undergraduate curricula of most institutions of higher learning.

Because the Dartmouth Time-Sharing System has an elaborate automatic text-editing program, Luehrmann said Compute expects to move rapidly and inexpensively from raw manuscript to camera-ready copy for a large printing or to multilith masters for a smaller printing.

DP Courses Videotaped

WELLESLEY HILLS, Mass. – The Honeywell Institute of Information Sciences is offering three DP courses on video tape.

A 24-hour course, "Techniques of File Design and Data Base Structure," and two other courses, "Basic – The Language of Time Sharing" and "Introduction to Pert," are offered.

Computer Club Kit Available

DES MOINES, Iowa – A computer club information kit for schools has been designed to provide suggestions, materials and encouragement in seeking how every high school can bring to interested students an opportunity to explore computer science.

The booklet contains a definition of a computer club; statement of objectives; duties of the sponsor and suggested activities.

Also included are two chart articles entitled "What is a Computer" and "Programming"; practice problems; bibliography; and a proposed constitution for clubs.

These booklets are available from the Association for Educational Data Systems, 1201 16th St., N.W., Washington, D.C., 20036, for $1 to cover printing and mailing costs.

Conclave to Study Health Data Net

BUFFALO, N.Y. – The world's largest health data network, and the likelihood of its establishment, will be the chief topic of an educational conference to be held here June 3-5.

Presented by the Continuing Medical Education Program of the State University of New York at Buffalo, the conclave will explore past experience with large health data systems, plus the technical requirements, data needs and human responsibilities necessary to the planning of any future systems.

The conference will revolve around a recently completed design for an automated health data system for the Western New York State area, which, if implemented, would potentially serve some 2.3 million residents.

According to Dr. Elemer R. Gabrieli, conference chairman and chief architect of the Western New York plan, the evolution of well coordinated larger health care delivery systems is a necessity, the development of which is dependent upon the establishment of an effective data system.

The Health Data Network for Western New York would be entirely voluntary with respect to the participation of medical personnel and patients.

The eventual growth and linkage of such systems on statewide, national and international levels will no doubt prove invaluable in the future in the tracing of disease trends and the establishment of health care priorities, according to Gabrieli.

He points to the detection of the dangers of thalidomide through the record linkage as proof of the usefulness of such systems in tracking down the causes of many diseases.

Conference speakers include U.S. Surgeon General Jesse L. Steinfeld and other governmental and professional representatives. Also participating will be Dr. John A. Baldwin, Regius Professor of Medicine and medical director of the University of Oxford Record Linkage Study, the largest medical record linkage system in the world, and Dr. Lars Erik Bottiger of Danderyd, Sweden.

Applications for the Conference on the Area-Wide Automation of Health Data can be obtained from the State University of New York at Buffalo, 2211 Main St.

VIPs Learn About DP

NEW YORK – Union Carbide Corp. believes its executives are never too old to learn about data processing.

Around 1965 the chemical company discovered that its management was having difficulty communicating with its DP experts.

"They didn't have the same goals; they didn't even speak the same language," said Hugh H. Babcock, head of the company's training program.

So the company decided to give its executives a liberal arts education in computers, covering everything from theory to operations. More than 2,500 members of the company's management have taken the course. Late in 1968 the course was opened to outsiders and since then almost 20,000 persons have gone through the program, now refined to two mornings.

Robots, Betting Seen 'Innovative' Conference Material

NEW YORK – A projection of the new sophisticated concept of the computer, "Eyes for Robots," will be offered by Patrick Winston of MIT during the State University of New York's Stony Brook Conference, June 11.

This 5th annual conference, cosponsored by the Long Island Chapter of ACM, is "inspired" by the response to previous conferences that have drawn as many as 700 attendees from all parts of the country. The conferences have been characterized by the "innovative material" presented and the relaxed informal structuring, ACM noted.

"Our aim is to gather a group of prominent speakers to discuss subjects of great current interest, to examine new systems which depend heavily on computers, and to explore future problem areas," stated conference chairman, Aaron Finerman.

The morning session, chaired by Max Goldstein of New York University, will start with an analysis of the coming crisis in education and employment for computing graduates by Joseph Weizenbaum of MIT.

In his robot presentation, Winston will discuss the "exotic vistas" which advanced technology are opening through the use of sensing devices linked to computers in a real-time environment.

The large costs involved in developing and operating sophisticated new management information systems will be explained in a talk on "MIS: The High Cost of Complexity" by George Glaser of McKinsey and Co.

One of the most knowledgeable authors and speakers on computer technology, Daniel McCracken, will discuss "The Blackened-Silver-Coin Test for Poisonous Computer Applications."

The afternoon session, chaired by Walter Carlson of IBM (and president of ACM), will start with discussion of the many factors to be considered in implementing an offtrack betting system by Edwin Brenman of New York City's Bureau of Budget.

A description of the problems of the promising but still elusive field of interactive computer graphics will be presented by Andries von Dam of Brown University.

The all-day session will close with a discussion by James Martin of the IBM Systems Research Institute on the future of telecommunications networks.

The registration fee including luncheon is $15. The conference will be held in the Lecture Hall Building.

For further information, call Mrs. Lenore Rosen, Computing Center, Suny (516) 246-7173.

Retrieve Better, Workshop Papers Challenge DPers

WASHINGTON, D.C. – The conference *Proceedings* are now available for the American Society for Information Science (Asis) Workshop on Computer Composition, held here last winter by the Potomac Valley Chapter.

The 45 participants were drawn from a variety of fields involved in computer-controlled typesetting and photographic composition. These diverse groups included: computer hardware manufacturers, software and systems organizations, the printing industry, publishers, universities and research institutes, government, unions, trade associations, professional societies and other user groups.

The workshop provided assistance to the science-information community in the exploration of technological and related issues, including the latest techniques, methods for their employment, available equipment and the benefits obtained from the application of computer composition.

Latest Techniques

The *Proceedings*, published by Asis, contains the papers prepared for the workshop and a transcription of the panel discussions on the four topic areas (user needs, hardware, software and systems and costs and economics). It includes a challenge paper calling for specific cooperative action on the part of the computer, publishing and printing industries to exploit new technology in such a way as to improve the creation, transmission, storage and retrieval of information.

The publication can be obtained from Asis, 1140 Connecticut Ave., N.W., Suite 804. The publication will be available, at a later date, in microfiche form.

French Film Debuts

WASHINGTON, D.C. – A century-old piece of French microfilm is one part of an exhibit scheduled for opening May 20 in the Smithsonian Institution here.

Sponsored by the National Microfilm Association, the exhibit includes slides and a recorded history, plus a look at future uses of the technology.

The exhibit will remain in the Museum of History and Technology until mid-October, when some of the pieces will be placed in the Smithsonian's permanent collection in the Hall of Photography.

COMPUTERWORLD

societies/user groups

Programmers' Journal 'Calls' For Decision Table Papers

NEW YORK – The translation of decision tables into computer programs will be the subject of the September issue of *Sigplan Notices*, the monthly publication of ACM's Special Interest Group on Programming Languages.

Although the idea of program definition in tabular form dates to 1957, only in recent years have decision table processors become widely available, ACM stated. Their value is now known to DP management, although reports on practical experience with working algorithms are mostly lacking.

The reason for this, ACM claimed, was that most decision table processors are still the proprietary products of software firms.

Sigplan is soliciting papers for the special issue. They should deal with either manual or computer-oriented translation algorithms, discuss and compare table formats and entry types from the standpoint of their suitability for translation, describe tests to be applied for the detection of redundancies or contradictions, or compare standard and decision table techniques on the basis of analysis, design, programming and documentation times.

Papers should be no longer than 5,000 words, or 25 pages, including any appendices. To meet publication deadline, they should be received no later than July 1, and should be sent to Bruce Silberg, 14 Clifton Terrace, Weehawken, N.J. 07087.

Data Educators Can Establish Placement Files

LIVERMORE, Calif. – Data educators and other DP professionals may now establish placement files with the Society of Data Educators (SDE) Placement Office here. Such files are used for mailing to prospective employers when seeking new positions.

Each confidential file consists of the applicant's one to five-page resume and as many as 10 letters of recommendation.

The applicant may not see the contents of his file, but the file will include only letters requested by the applicant; the file will be mailed to prospective employers only upon written and signed authorization of the applicant whose file is being mailed.

To establish such a file, write to Enoch Haga, Placement Office, SDE, 247 Edythe St.

An initial fee of $15 must be paid for establishing the file, and thereafter a processing fee of $5 will be payable each time the file is mailed to a prospective employer at the applicant's request. Membership in SDE is not required to take advantage of the Placement Service, and the service is open to both educators and noneducators.

Time, Money Stressed for Ecology

NEW YORK – The increasing trend toward controlled-environment office buildings is apparently a major contributing factor to the sad state of the ecology.

The increasing demands for accuracy of voltage, and the increased usage of air conditioning for temperature and humidity control for computer centers, is placing a burden on power generating plants which are placing a burden on the ecology, power experts told CW.

It will take $125 billion and 30 years to clean up accumulated damage to the environment caused by power plants, according to an article in a current journal published by the Institute of Electrical and Electronics Engineers.

The charge is made by Philip Sporn, internationally known utility engineer, executive, and member of the National Academy of Sciences, in an article titled "Our Environment – Options on the Way Into the Future," appearing in the May issue of the IEEE *Spectrum*.

The piece is based on a lecture Sporn delivered to the IEEE Power Engineering Society.

Universal S/3 Next?

CANOGA PARK, Calif. – The National Association of IBM System/3 Users, Nasu, may have to change its name to "International," for among its 12 chapters is one in Winnipeg, Canada.

Stateside chapters are located in many major metropolitan areas, including Los Angeles, New York, Chicago, Philadelphia, Houston, Phoenix, Washington, D.C., Milwaukee and El Paso.

Parties interested in joining existing chapters or in forming new ones should direct inquiries to Nasu at 23331 Vanowen St.

ACM '71: 'Challenging Program'

CHICAGO – The "challenging program" being offered by ACM '71 will draw a record attendance, according to optimistic officials of the Association for Computing Machinery. The theme of the meeting, which will take place at the Conrad Hilton hotel here, August 3-5, is "Decade of Dialogue."

Setting the stage for the 1971 conference, President Walter M. Carlson recently said, "Decision makers want to control computers, not the reverse." This comment arose most specifically from such sectors as the government and urban areas, where the public interest is most directly affected, he said.

"There are two sides of this coin," Carlson related, "control of decision makers by the information processing staff, and control of those governed by those who govern. How do the originators of these vital new computer technologies plan safeguards?"

Speakers at ACM '71 will include legislators, computer scientists, government officials, and academicians who might provide some answers, a conference spokesman noted.

'Public Service'

"Public service" exhibits planned for ACM '71 will emphasize computers serving man and will be open to the public without charge.

The meeting will also mark the 25th anniversary of the first practical use of an electronic computer and most of the distinguished pioneers in the new science will be invited to attend.

The "Decade of Dialogue" theme represents a continuation of the effort at last year's meeting to bring computer scientists and the general public into a closer mutual understanding of the computer's potential in finding solutions to the complex problems of today.

ACM '71 planners are also working on the final details for the professional sessions dealing with major phases of computer technology in an effort to provide attendees with "substantive information" on the state-of-the-art.

Calendar

May 21-22, New York – Communications Systems Management Association (CSMA) Annual Conference. Contact: CSMA, Box 2805, Wilmington, Del.

May 24-26, Boston – 1971 IEEE Power Industry Computer Applications Conference (Pica). Contact: Paul L. Dandeno, Hydro Electric Power Commission of Ontario, 620 University Ave., Toronto, Ontario.

May 25, Washington, D.C. – 20th Annual National Microfilm Association Convention. Contact: National Microfilm Association, Suite 1101, 8728 Colesville Road, Silver Spring, Md. 20910.

June 3-4, Washington, D.C. – Quarterly Users Group Meeting of the Formatted File Systems Commercial Users Group. Contact: Mr. Ralph S. Greer, FFS-CUG Secretary, Technetics Corp., Suite 456, 414 Hungerford Drive, Rockville, Md. 20850.

June 7-9, Chicago – International Computer Forum and Exposition (Comfor) sponsored by National Electronics Conference. Contact: R.J. Napolitan, National Electronics Conference, Oakbrook Executive Plaza 11, 1211 W. 22nd St., Oak Brook, Ill. 60521.

June 11, New York – Fifth Stony Brook Conference "Advances in Computing," co-sponsored by the Long Island Chapter of the Association for Computer Machinery and State University of N.Y. Contact: Mrs. Lenore Rosen, Computing Center, Suny at Stony Brook, Stony Brook, N.Y. 11790.

June 22-25, Houston – DPMA 1971 International Data Processing Conference and Business Exposition. Contact: Steve Coha, Public Relations Director, Data Processing Management Association, 505 Busse Highway, Park Ridge, Illinois. 60068.

June 24-25, Montreal – Adapso 32nd Management Conference "Profits Now." Write: Association of Data Processing Service Organizations, Inc., 551 Fifth Ave., New York, N.Y. 10017.

Electronic Animation

Teacher Gives Life to Drawings

COLUMBUS, Ohio – An Ohio State University professor here has developed a computer technique for creating "live" three-dimensional illustrations that change size, shape and duplicate the movements of objects they depict.

Drawn with an electron beam on the face of a video tube, the drawings respond when the artist instructs the computer to induce movement, follow a prescribed path or change from one shape to another.

For example, a helicopter drawn on the screen of the terminal hovers and moves in any direction – its two blades turning at different speeds. The artist executes changes in movement of the object with the electron beam light pen, and a keyboard.

The technique was developed under a National Science Foundation grant by OSU's Charles Csuri, professor in the University's College of Arts. The program employs an IBM 1130 computing system and a 2250 graphic display unit.

To capture drawings made with the system, a black and white video tape is made of the moving object, right from the screen of the computer terminal.

"In addition to being a time saver, electronic animation makes it possible to do things that were never before possible," Csuri said.

"Now, when a teacher uses a blackboard to illustrate lectures, he usually draws flow charts or graphs to illustrate his concepts or points being made. How much more meaningful it would be to visually interpret, through dynamic animation, any concept – from molecular structures to the makeup and function of bodily organs."

The program developed by Csuri and his associates also has applications for business and industry.

In the past, such computer simulation or models usually took the form of graphs or charts which had to be interpreted into performance.

This type of program development can add a new dimension to such testing, since the operator seated at the computer terminal can introduce variables or changing environmental conditions at will and in'finite combinations.

The blurrad image of a helicoptar in flight, which employs a double exposure to show the helicopter movement, depicts the electronically created drawing as it would be seen from inside the terminal looking out.

The suspended image of a helicoptar, captured here in a stop action photo with Prof. Csuri, depicts a technique developed for creating "live" animation on the face of this IBM 2250 terminal.

Car Body Design Uses T/S Service For Custom Jobs

TURIN, Italy – Custom-made automobile bodies have been a specialty for more than 40 years for Pininfarina of Turin.

From drawings and models, numerical data relating to new body work is collected by use of three-dimensional or two-dimensional digitizers.

The numerical data obtained through the digitizers is punched into paper tape and sent via a typewriter-like terminal to the time-sharing computer system operated by Honeywell Information Systems Italia.

Using special interpolation programs developed and provided by Pininfarina engineers, the computer integrates and processes the data and provides a punched paper tape output on a terminal in the design studio of the body designer.

This output tape is placed on a large-scale plotter that turns out the design of the car body or its details, according to a wide variety of views and sizes that can be quickly modified.

Microfilm Credit File System Closes Creditability Gap for Bank Customer

OKLAHOMA CITY, Okla. – By dictionary definition, creditability is the quality or state of being creditable, worthy of commercial credit. While John Doe's creditability has always concerned credit managers, its importance has multiplied many times in today's fast-paced credit card economy.

Oklahoma's pioneer bank credit card operation by Liberty National Bank and Trust Co., established in 1966, quickly found itself in danger of strangling on the twin problems of credit verification and authorization. By mid-1969 Liberty Bankamericard was foundering in its own mass of credit card records. Creditability determination was becoming almost unmanageable.

An on-line computer credit authorization procedure has been tied to a microfilm credit file system and the stacks of cradit records have been reduced to manageable, organized film references. Liberty and the 5,000 merchants participating in its credit card program now have almost instantaneous access to John Doe's creditability.

Heart of the compact setup is the Remington Rand Credit-Ability System which not only replaced the unwieldy manual filing operation, but provides instant reference and viewing facilities. When linked with the pushbutton accessibility of on-line computer information, it constitutes a sophisticated credit system with a daily updating and reporting capability.

The system is geared to fast, simple availability of microfilm records. Its base is the individual customer's, the credit card holder's, filmed by a rotary microfilm camera. Processed by an in-bank developing unit and returned, it is verified against original data for completeness, then inserted into a mylar jacket.

The jacket then is stored – filed – in a compact electromechanical retrieval unit called a Kard-Veyer. An individual unit provides storage for about 100,000 mylar file jackets.

When information on a customer is demanded, a Diazo copy can be produced at once and the microfilm master is returned to the Kard-Veyer unit. The master is not allowed to leave the central file area, thus absolute file integrity is assured.

Data from the individual master or Diazo copy can be reviewed instantly on a film reader.

The system supplies information for the final decision on a merchant's request for authorization of a Bankamericard credit purchase.

The merchant telephones to report, following a prescribed format, that a customer wants to charge an item on his Bankamericard. An authorization clerk keys in the customer's card number on a remote computer terminal. This triggers a request for the customer's credit limit, how much he currently owes, when his last payment was made.

Within seconds the computer reports each of these and indicates whether the purchase can be accepted or not, depending on whether it would increase the total owed by the customer beyond his credit limit.

If the computer approves the purchase, it simply says so on the video screen of the computer terminal. If the purchase cannot be authorized, the customer's current history is displayed on the screen of the computer terminal.

Here the human element is permitted some leeway. The authorization clerk is given discretion to allow up to 20% over credit limit.

If the computer refuses to authorize the purchase, the customer may want further action. The merchant's request then goes to a credit supervisor.

Again the human factor is present – the supervisor's decision whether to approve the purchase. Credit history is reviewed and the supervisor may not only give approval but raise the customer's credit line as well. Or the purchase may be turned down.

Where files once were never up to date, the microfilming system now keeps them current and safe. The credit card department has been able to approach stabilization of its personnel against the time when even adding more people was not enough to make the manual system work properly.

The combination of computer and microfilm makes it possible to handle efficiently the present volume of almost a half-million cardholders.

Conventional files are much too cumbersome and space-consuming. The answer to the need for storage of requisite verbal information in the bank credit card program appears to lie in microfilm.

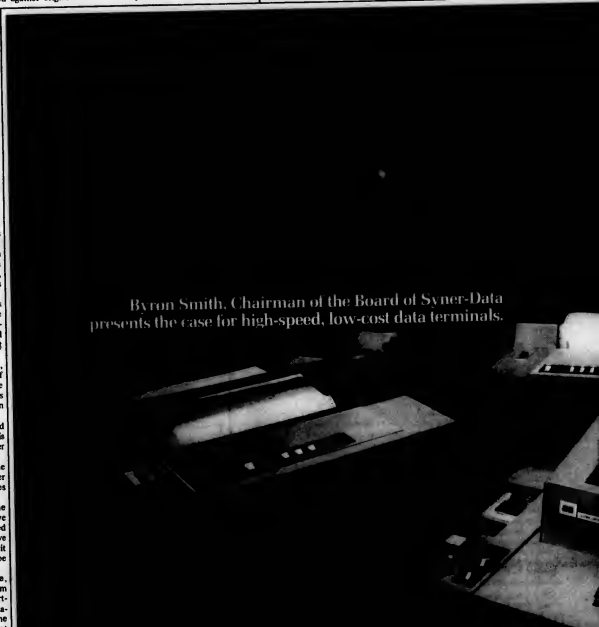
Have Computer, Will Travel

ANN ARBOR, Mich. – Acoustic scientists at the University of Michigan are using a transportable computer to help them with several aspects of analyzing how sound waves travel in ocean water. Because their researches require them to go to an ocean location, the scientists of the University's Cooley Electronic Laboratory are using a minicomputer in a two-piece system designed to travel to facilities near to where the experiments are conducted.

The experiments are concerned with how traveling through salt water affects a sound signal.

Experiments have been conducted in waters off the coast of Florida and in the Bahamas. In a typical experimental setup, an underwater listening device, a hydrophone, is placed in the experimental area and is connected by cable to the PDP-8/L computer, located in a laboratory close to the shore. The cable lengths are generally one or two miles. The signals being received at the computer are often masked by the natural "noise" of the ocean; shipping, biological noise and ocean surface generated noise.

In order to improve the reception of the signals so that they can be analyzed, the computer performs a process known as "signal averaging," in which many samples of a weak signal are taken, stored, and added together. By this means, a strong composite signal can be obtained.



Byron Smith, Chairman of the Board of Syner-Data presents the case for high-speed, low-cost data terminals.

Firm Outgrows Keypunching, Likes OCR Flexibility

By Phil Feltham
Special to Computerworld

BIRMINGHAM, Ala. – An optical character reader, which reads data from hand-printed documents, has eliminated a serious and costly information bottleneck at U.S. Pipe and Foundry Co., with an unexpected bonus.

Like other companies, we found our computers were lightning fast, but our input, which includes data from well over 100,000 documents a month, was slow.

A year ago, our keypunch section had outgrown itself, and we didn't have the facilities or budget to continue expanding it to handle the growth of the company's computer operations.

Using an IBM 1287 optical reader for direct data input, we have reduced our keypunch overhead by 50% and expect to reduce it further, although we have added major new computer applications.

Savings are projected at $2,500 a month, and key reports are available to management earlier, along with sales and market information which could not be provided before because of limited manpower resources.

U.S. Pipe justifies use of an optical reader for a number of diverse business activities, rather than through a single large application. The company is the largest domestic manufacturer of cast iron pressure pipe and fittings.

Through divisions and subsidiaries it also manufactures soil pipe, concrete, steel and chemical products, operates its own coal and ore mines, blast furnaces, coke ovens and retail and wholsale networks, and Lorch, Inc., a chain of jewelry stores.

Divisional Accounting

Computer applications handled via the optical reader assist top management in its control over the company's multi-faceted operations. Accounting for the seven divisions is handled as though each were a separate company. Division accounting has doubled journal entries alone from about 7,000 to 14,000 monthly.

The change-over gives each divisional president a comprehensive picture of his business in comparison with the rest of the corporation.

Without the optical reader, this level of reporting would not be possible within six working days after the accounts are closed at the end of each month. We wouldn't have had enough space to accommodate all the clerks needed to maintain the books for seven divisions.

The optical reader, which is linked to a 360/30 and a 360/40, handles eight separate applications, including journal entries. These are: plant stores requisition reports, involving 14,000 documents and 50,000 line items a month; stores receiving reports, and 5,000 documents and 15,000 line items a month. Accounts payable with 7,000 documents a month; physical inventory; 50,000 documents a year; and a special utilities program to handle one-time reports are also included.

Books are also processed for Lorch, Inc., which had 95,000 sales slips with some 285,000 line items in December, 1970, and Southeastern Bolt and Screw Division, involving 18 wholesale branch outlets with more than 50,000 documents a month.

The changeover from keypunching to the optical reader was accomplished with surprisingly few problems. It was tested successfully in parallel with keypunched stores requisition documents in the North Birmingham pipe plant for about two months. Once the system's reliability was proven, four other plants were added the following month, and five more the next.

Employees Trained in Printing

The main consideration was training employees to use the correct handprinted characters on the OCR forms. Brochures on each application were prepared, employees saw the optical reader in operation.

"By any standards we feel that our applications are a success," says Eddie Hill, systems analyst for the 1287. "The national average for character rejects is 1.45%, and our rate is only a third of that."

Lorch is the largest volume user of the optical reader, with 77,750 documents in November and 95,000 in December. Before its operations were put on the optical reader, Lorch's accounting was done by its own keypunch staff and an outside service bureau.

An estimated $14,000 a year is being saved in administrative and keypunch expense, accounting machine rentals, and service bureau fees, according to Eddie Allbritton, Lorch assistant controller.

Last year, nine girls worked overtime to close out Lorch's November books on the eleventh working day. This past November, 6.5 people working with little overtime closed out the books on the sixth day, though there were 11 more stores than the year before. The chain can increase its volume substantially without increasing administrative overhead or personnel.

Handwriting Summary

A special report, the handwriting analysis summary, identifies clerks and managers who are having difficulty forming the characters so the machine can read them.

For each store, it lists the total number of characters each clerk has written, the total rejected, and what the rejected figures were. The managers talk with the clerks, show them what errors they are making and how to correct them; the supervisors follow up with the store managers. Few individuals have trouble printing the correct letters.

It takes less time to train a sales account clerk to prepare handwritten documents than to train him to use sales accounting machines, Allbritton noted.

At U.S. Pipe, we feel we have barely tapped the potential of the optical reader. We use it three or four hours a day; and, of course, we could use it 24 hours a day.

Fortunately we can run two jobs at once on the computer – the OCR in the foreground, eliminating the keypunch in storing information, and at the same time doing computer work on other applications.

We feel that only our imagination limits new applications for the 1287. We believe that any company can break even on an optical reader if its use can effect corresponding savings in administrative overhead. We at U.S. Pipe are looking forward to the OCR applications planned for the future.

Phil Feltham is manager, DP, systems and procedures, U.S. Pipe and Foundry Co., Birmingham, Ala.

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Computers Attack Water Pollution

CW Midwest Bureau

Man, it is said, can survive four days without water. Of those four days, only the first one is really tolerable – if it can be said that a burning headache and parched mouth, eyes and nasal membranes can be tolerated.

In the last three days of thirsting to death, man reverts totally to the beast and he is aware of the agony of a thirsting death. And with that awareness comes his concern for the manner in which he has wasted that vital ingredient of life: water.

Now, thoroughly concerned and perhaps a little frightened, man is using his intellect and his resources in an effort to reobtain what he has always so desperately needed. Data processing has become one of his more important tools.

The National Science Foundation (NSF) reports on an outlined project that is slated to come to the aid of the greatly disturbed Chesapeake Bay area.

Scientists and engineers from Johns Hopkins University, the University of Maryland and the Virginia Institute of Marine Sciences have combined into an interdisciplinary study of the problem the causes and the solutions of the man-caused troubles of the day.

One ultimate aim of the NSF-funded plan is to create a computerized data bank that can be queried or consulted by scientists and regulatory or legislative decision-makers for information on proposed changes related to the bay or its drainage area.

Detailed Bank

According to NSF, the plans call for a highly detailed bank of literally all entities, processes and characteristics of the region.

The main goal of the project would be the ultimate better management and control of the bay area as a major regional and national resource.

Computers, too, are being used extensively to create simulations. In Appleton,

DP and the Changing Environment

Wis., scientists at the Institute of Paper Chemistry have filled a 360/44 with a river of their own making . . . . mathematically.

The researchers have their own river with its own ecological loads to study to determine the effects of pollution.

The computer, scientists say, mathematically recreates a river with varying characteristics of depth, widths, currents and falls. The programming also inputs the results of some natural processes like re-aeration.

The simulation is based upon the material balance formula which calculates the amount of oxygen in the river. Two common types of pollution are being researched – organic materials that can be water assimulated and suspended solids.

Scientists can now go to a real river armed with data they obtained from a "river in a computer" to help battle pollution.

The project, according to the Institute scientists, allows the study to estimate the effectiveness of pollution abatement programs, procedures and devices.

Thermal Pollution

In another project, the University of South Florida is studying the effects of thermal pollution in the Gulf of Mexico. Special buoys, each one a virtual laboratory, are anchored near known heated water discharge outlets. The buoys measure temperature and salinity at various depths. The data obtained from the buoys is then analyzed on the University's computers.

The Air You Breathe...

STATE COLLEGE, Pa. – According to a recent U.S. Public Health Survey, people who breathe polluted air get more colds than do people who breathe clean air. A three-year research project here at Penn State University is attempting to find out whether that statement is medically accurate and then determine why.

It is also suspected that air pollution is causing lung tumors and a destruction of the protective lining of the lungs. These and other effects of air pollution are being studied by the researchers with the assistance of a computer.

To study the effects of air pollution, four test colonies of animals are exposed to controlled environments and examined medically. One test group breathes filtered air; a second breathes nitrogen dioxide; another, carbon particles; and the fourth breathes both carbon and nitrogen dioxide.

Input from the experiments – pollution amounts breathed, time lengths, medical examination results and findings, etc. – is fed to the university's IBM 360/67 at the Computation Center.

The output – in graphs, equations, or numercial values – keeps the researchers informed of the experimentation's results.

Interstate Agency

Monitoring Network Checks on Ohio River Pollution

CINCINNATI, Ohio – A computer here keeps the Ohio River Valley Water Sanitation Commission (Orsanco) informed on the filth, or cleanliness, of the 981-mile-long Ohio River.

Electronic samplers at 27 stations along the river and its tributaries constantly analyze water for dissolved oxygen, temperature, pH, conductivity, oxygen reduction potential, chloride and solar radiation intensity, and a computer analyzes the findings hourly.

Data monitored at each sampling station is sent on-line to Orsanco headquarters and fed to an IBM 1130. The CPU combines the input with riverflow forecasts from the U.S. Weather Bureau and analytical data forecasts from the U.S. Weather data from the U.S. Geological Survey to produce appraisals of the river's water quality conditions.

Using the hourly reports, Orsanco technicians are able to pinpoint a polluting source by identifying the condition of the water and where in the river the pollution was first detected.

Orsanco is an interstate compact agency

DP and the Changing Environment

created by joint consent of the states involved, providing support services for Ohio, Illinois, Indiana, Kentucky, New York, Pennsylvania, Virginia and West Virginia. Each of the states either borders on the Ohio or has tributaries feeding into the Ohio.

Robert K. Horton, executive director of the commission, said Orsanco's use of the computer makes it possible to analyze a massive amount of data and react to water problems as they are occurring.

"Our goal," Horton added, "is to bring about full compliance with water quality standards established by the commission."

He noted that in 1948, when the commission was founded, only a fraction of 1% of the 3.6 million population on the Ohio River was served by sewerage treatment facilities. At present, 99.5% of the population is served.

"The job is far from complete," Horton added, "because many of these facilities must be expanded to provide a greater degree of treatment.

"We also want to refine the computer monitoring network so that it is even more responsive to situations that result from industrial or municipal accidents or negligence," he concluded.

Technician on the banks of the Ohio River checks printout indicating local conditions and origin of pollutants.

Foresters Combine Beauty and Profit With DP Inventory

HOUGHTON, Mich. – A computer in the forests of Michigan's upper peninsula is showing industry how it can profit and still enable the public to enjoy a forest's beauty.

A computerized forest inventory has revealed that both the economy and tourist value of the North Country forests can be improved by better managing natural resources. Forests that are cut frequently for short-growth pulpwood crops can be enjoyed longer aesthetically, and produce greater dollar return by a switch to the longer-term investment in hardwood logs used to make fine furniture.

This is just one of several new forest management ideas formulated by foresters at Michigan Tech University here. Using a computer, they are classifying trees, sampling growth and recording a variety of other data on trees in a 4,000 acre research forest.

Prof. James W. Meteer, research forester at Michigan Tech's Ford Forestry Center, said: "Ninety percent of the upper peninsula is forested. Our entire economy is based on wood products, tourism and other industry related to the trees."

The inventory is based on a sampling technique. The center keeps records on each of 30 to 40 trees in 1,000 one-fifth-acre plots. Field workers classify the trees, soil conditions and rainfall on each plot. They measure and record tree growth and note mortality of premature trees. All of this information is input to an IBM 360/44 which completes a statistical analysis of the sample and projects data to cover the entire forest.

Indian Affairs Unit Commissions System On Natural Resources

WASHINGTON, D.C. – Boeing Computer Services, Inc. has been awarded a $80,075 contract to design, develop and demonstrate a natural resources information system (Naris) for the Bureau of Indian Affairs.

"The development of Naris will represent a significant milestone towards achieving control and management of our earth resources," J. Harry Goldie, executive vice-president of BCS, said.

In the initial phase of the one-year contract, BCS will collect and analyze data from the land management offices of the Bureau of Indian Affairs, eastern Arizona field office of the Bureau of Land Management and from survey maps and data from satellite systems.

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Statistics Show Atlantic Fish Population Dwindling

WOODS HOLE, Mass. – The famed fishing grounds of the Grand Banks, Georges Bank, and other Northwest Atlantic areas, face depletion of fish which have populated them for ages.

The numbers of haddock, herring, cod and some other species of fish are dwindling in the waters off Labrador, Greenland, and Newfoundland, according to the National Marine Fisheries Service's Biological Laboratory in Woods Hole.

As part of its studies, the lab compiles complete statistics on fishing in the Northwest Atlantic area from Nova Scotia to Cape Hatteras, using a computer. Its reports cover about 100 species of fish, showing where they are caught, what type of equipment was used, and other information.

In 1969, about 1.58 million metric tons of fish were caught in the area, according to the computer's statistics. This included 25,000 tons of haddock, 45,000 tons of cod, and 58,000 tons of yellowtail flounder, species which are of particular importance to New England fisherman. Final totals for 1970 are expected to be over 1 million tons.

The haddock situation looks particularly serious, according to Richard Hennemuth, chief of the population dynamics program at the laboratory.

DP and the Changing Environment

Herring, scallops and cod are also dwindling fast, Hennemuth adds, and the yellowtail flounder is in immediate danger of possible depletion.

Overfishing accounts for much of the increasing scarcity, Hennemuth asserts, pointing out that as many as 150 vessels may fish at Georges Banks, between Cape Cod and Nova Scotia, at one time.

The "fishing computer," a Univac 9200, at Woods Hole receives its data chiefly from forms filled out by dealers, interviews taken by port agents after a fishing vessel comes home, and from survey cruises by the two research vessels operated in the area by the Fisheries Service.

The computer prepares reports on landings by gear, species and area, or on the special scientific surveys. This information is published in the U.S. Fisheries Statistics Bulletin at the end of the year, as well as in the bulletins of the International Commission for the Northwest Atlantic Fisheries.

The statistics deal mainly with high seas species – fish caught ten miles or more off the U.S. coast. At present, the Woods Hole office has no evidence that pollution is affecting these species, although pesticide residues tend to cut down the productive processes of plankton closer to shore. These residues may also affect the survival of some fish, such as summer flounder, whose larval stages are spent inshore.

Bay Gets Help From Simulation

MONTEREY, Calif. – A college professor here has called in airplanes, ships, radar and computers to help map pollution in Monterey Bay.

Oceanographer Edward Thornton of the U.S. Naval Postgraduate School uses the computer to simulate mathematically the bay's natural currents. He expects his study eventually to assist public health authorities in improving the quality of California coastal waters.

The ships and planes, operated by the school, are used by researchers gathering current data. The currents are measured directly using current meters placed in the deep ocean and also by floats tracked by radar from shore. These floats follow the currents, indicating basic flow patterns in the crescent-shaped bay down the Pacific coast from San Francisco.

Thornton has built a mathematical replica of Monterey Bay inside the 360/67. The bay's coastline coordinants and depth are recorded, along with tide factors and wind speed and direction.

"Ocean currents outside the bay can drive the water of the interior of the bay to create large eddies," Thornton said. "These eddies can either enhance the dispersion of pollutants or, under different conditions, act to concentrate them close to shore.

"This model should help us understand how the water circulates in the bay and tell us where the pollutants go under various conditions."

After collecting the water flow information through air and sea observation and radar tracking of the floats, Thornton adds weather data, tide information and other variables to his model.

The model represents the bay in the form of a grid pattern. When all details are provided for a specific date and time, the system can deliver current velocity at each intersection on the grid – hundreds of points in all.

FDA, Computer Look For Food Impurities

CHICAGO – A new era in field laboratory analysis of food samples for pesticide residues by the Food and Drug Administration has begun with the use of a new computer system by the Chicago district office.

The computer is being used in a pilot program for data acquisition, analysis and experimental control in pesticide analysis.

Pesticides Identified

The DEC PDP-12 is interfaced to the lab's gas chromatograph, which separates and quantifies small amounts of pesticides in a food sample. Each sample is screened for 30 chlorinated and phosphate pesticides commonly found in food. The samples are checked against a standard for qualitation and quantitation. The computer then tabulates and identifies pesticides present, and prints out the results in parts per million.

The new system is expected to greatly reduce sample calculation time from as long as two hours to minutes.

FDA's configuration includes a central processor with 8K words of core memory, a 32K word disk storage unit, magnetic tape storage units, the CRT display, an analog-to-digital converter, a digital-to-analog converter and a teletypewriter.

Information for each sample analysis is represented graphically on the display in real time, as a printout, and on the gas chromatograph recorder. The concentration of the chemical is proportional to the area under the peak displayed.

Peter Denning joined ACM for technical information and contacts.

Now he's involving other members in everything from microprogramming to data banks and privacy.

Peter Denning, 29, is an Assistant Professor of Electrical Engineering at Princeton. He's also an ACM member and chairman of our committee on special interest groups and committees (SIGs/SICs). He wasn't always as active in ACM.

"I joined in 1965 while working on my thesis," says Peter. "Mainly for technical material and a chance to meet other computer professionals. In 1968, I was asked to edit the Operating Systems (SIGOPS) newsletter. I got involved and quickly took on more responsibility. After two leadership positions, I ran for SIG/SIC chairman.

"Special interest groups are what ACM is all about," says Peter. "We've got 27 now, from microprogramming techniques to the impact of computers on society. One out of three ACM members belong to at least one group. I want this share to grow.

"Now I can do something about it. Like help restructure the whole SIG/SIC operation. Some groups may have to be split up, to cover less ground. Others need stronger leadership. A few we should have don't even exist yet, like performance evaluation and computer architecture."

Peter Denning is involved in ACM, the oldest and most respected association in the computer field. He's advancing his career. Sharing his ideas. And making a contribution to the computer profession.

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New Products and Applications

The data offered in these Reports and Profiles describe new products being offered to and by the data processing industry. Included are applications for these products as well as new applications for existing products. Reports include names of suppliers; users who have developed new applications for products; new general developments in the field.

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This Profile deals with the granting of data-processing contracts. Included are contracts for hardware, software, and peripherals. The information reported includes, wherever available, the names of the companies involved in the contract; a statement of the proposed work; the length of the contract, its proposed start-up date, etc. **(Circle No. 7)**

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Data-processing developments and applications for specific markets and uses of available products (hardware, software, services, etc.) are highlighted in these Reports and Profiles. Included are data detailing how the product is used for specific jobs; its value to specific user-markets; users of the product; companies offering the product; availability of the product; components of packages for user-markets.

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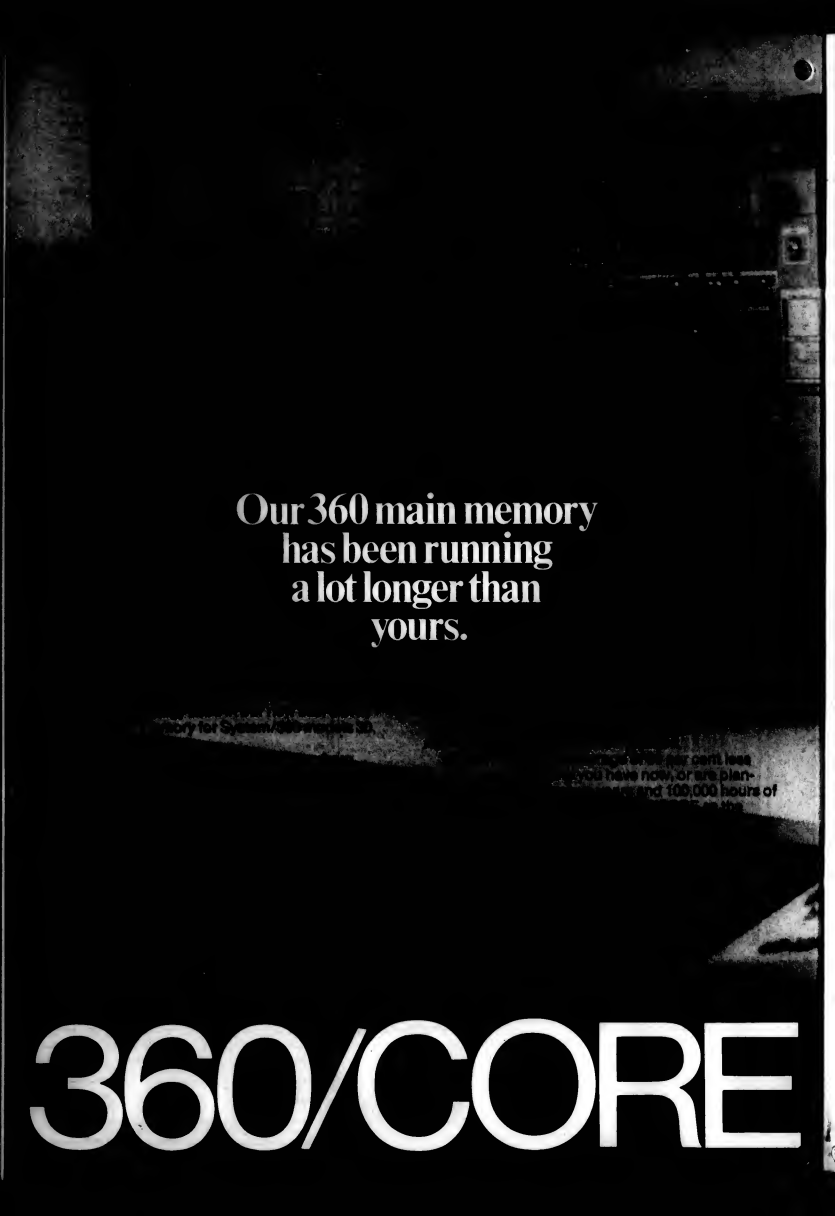
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CI Notes

Ampex Sets Joint Drive

ATLANTIC CITY, N.J. – Ampex will be staging one of the largest OEM exhibits at this week's Spring Joint Computer Conference with four new products for the OEM as well as two for the end user marketplace.

The new OEM devices include a tape drive, one set of tape electronics, and two core memory systems.

At the same time, reports trickling out of the firm indicate that its OEM business, which had followed the economy downward in the past year, has begun to bloom again, outpacing the general economic upturn.

Efficient Plans 370 Leases

NEW YORK – Efficient Leasing Corp. has elected Alen E. Shalov to the posts of chairman and chief executive officer of the company and declared it is formulating plans to lease IBM 370 computers and other DP equipment, a new area for the firm.

At the same time, it was also reported that Shalov and associates had acquired 90,000 common shares of Efficient Leasing – approximately 17% of the company's outstanding stock. Shalov was formerly a member of the board of directors, vice-president and general counsel of Data Processing Financial & General Corp.

Cartrifiles Ordered for MAC

MOUNTAIN VIEW, Calif. – Tri-Date Corp. has been awarded a $2.5 million contract by the Data Products Division of Lockheed Electronics Company, Inc., Los Angeles, for its Cartrifile tape systems. Tri-Date will also furnish engineering liaison.

Standard Cartrifile units will be delivered for incorporation in Lockheed MAC 16 computers. The first 200 magnetic tape units are scheduled for delivery before the end of 1971. In the configuration planned by Lockheed each DP system will contain two Cartrifile tape units: a Model 4196, and a Model 1124.

The 4196 has four independently controlled tape transports and storage capacity of more than 12 million bits. The 1124 contains a single tape transport with a capacity of 3 million bits on one tape cartridge.

Supershorts

Lockheed Electronics Co., Inc. will market world-wide a line of advanced air traffic control systems. Lockheed will concentrate on applying its MAC 16 minicomputer to terminal ground control systems for directing aircraft.

– – –

The first deliveries of Calcomp's "high density" disk drive system are scheduled to come by June 1.

– – –

In the past month, the total number of Ticketron computerized vending machines for the New Jersey Lottery has risen more than 350% – from nine to 34, at 21 locations. Fifteen more installations are presently in progress.

– – –

MRI Systems Corp., Austin, Texas, will hold its third annual seminar series, "Executive Decisions and the Computer Age," beginning July 11 at Vail, Colo.

Time-Sharing Analysis

Market Booming, Competition Heats Up

By a CW Staff Writer

Two new studies of the time-sharing market – one on the use of minis in time-sharing applications and one on the commercial T/S companies – confirm the belief that the market is booming, but overcrowded with competition.

The market for small computer-based time sharing systems was $24 million for 1968 and 1969 combined, and is estimated at $16 million to $20 million a year through 1975, according to the analysis developed by Digital Equipment Corp.

The overall time-sharing market will grow from $180 million in 1969, split between about 200 companies, to over $1.5 billion by 1975, according to the second report from Frost and Sullivan in New York City.

Small Systems Market

In 1971 the education field will control around 75% of the market for small time-sharing systems, DEC predicts, followed by time-sharing bureaus 15%, and general users, 10%, (primarily medium-size firms).

By 1973, however, the educational share of the market will have dropped to 50%, with T/S bureaus accounting for 15%, general users 20%, and software systems houses 15%, the DEC forecasts indicate.

Long-term projections of the small time-sharing market developed by DEC show the educational market share dropping to 35% as the share for software systems houses rises to 20% and the time-sharing portion achieves 20%. The share controlled by general users will reach approximately 25%, DEC estimates.

Commercial Market Overcrowded

There is a great deal of competition in the commercial time-sharing market with around 200 firms, according to Frost and Sullivan. At the same time, however, 22 companies in the field presently control 70% to 75% of the market.

These 22 companies are generally over three years old and have fairly extensive networks supported by large staffs, the report states. In addition, they have approximately 60% of the computer installations among T/S firms.

At present, not more than two or three of the major companies are operating at a profit in the industry, where the computer utilization presently runs at a rate of around 60%, according to the survey.

The firms in the field use computers valued at more than $140 million in annual rental revenues, with an additional $100 million to $140 million in peripheral and support equipment, the study shows.

Because of the overcrowded marketplace and the heavy capital expenditures in the business, the next five years will be a period of shakedown, the survey suggests. It estimates that the top 10 to 15 competitors may have as much as 80% of the time-sharing business in 1975.

Most of the top competitors in the field should be profitable by the end of 1972 with most of the major entries in the market place reaching that point in 1973, when they would become attractive candidates for acquisition, the report notes. It also warns that many of the small firms will leave the business, never having reached the black ink columns.

GE Launches DP Financing Plan, Separate Leasing Group Named

STAMFORD, Conn. – General Electric, which seemed to be withdrawing from the computer industry after merging most of its computer activities with Honeywell last year, has reentered the field through the leasing business.

The CE Credit Corp. has launched a program of computer financing and set up a separate national organization to administer the new project. It will be known as the Leasing Information Systems group and will be headed by Anthony Fasanella, former eastern region manager for Boothe Computer Corp., as national sales manager.

According to Fasanella, the group will offer a wide range of leasing and financing services although it is presently looking at various market opportunities and the needs of firms in the field.

He said that they will lease mixed systems as a package to large users that request them and stated that the firm would lease equipment from all of the manufacturers, not just IBM. Customers would be free to contract with any maintenance firm of their choice for maintenance services, he added.

The new GE organization could also contract with independent peripherals firms and others to handle all of its financing needs, sources said, adding that GE Credit Corp. has always in the past been more oriented to dealers than to users of leased equipment.

On the user side, Fasanella declared that "the full-scale entry of Gecc into the computer financing field means that any user can now quickly obtain his entire financing 'package' from one source."

Adapso Trial Date Set On Bank DP Services

MINNEAPOLIS – The trial date for Adapso's case against the U.S. Controller of the Currency and the American National Bank of St. Paul has been set for June 21 in the Eighth Circuit District Court here.

It is the first trial testing the participation of banks in the DP industry. The suit was brought by Adapso and Data Systems, Inc. of Minneapolis.

"The question here is whether the nation's banks may provide EDP services to the public," stated Bernard Goldstein, president of Adapso.

Modcomp III Is Well-Traveled But Weary

ATLANTIC CITY, N.J. – Modular Computer Systems Modcomp III system, planned for Data Printers' SJCC exhibition, is a well-traveled computer and it also likes scotch and peanuts.

It's been around, visiting 22 of the leading companies in Fortune's 500 and giving 39 demonstrations. Over the past two months this Modcomp has been trucked 12,367 miles – enough to travel coast-to-coast four times. And its brother, another Modcomp III, has traveled 5,200 miles along the West Coast with 20 hardware software presentations at 11 user locations.

Modcomp has been left all night in Toronto and Ottawa sleeping in the back of a truck while temperatures dipped below zero. It sat on the Indiana Turnpike in freezing temperatures when the truck's engine broke down. It also dozed in the Florida sun in mid-80 temperatures.

Bill (William L.) Arbuckle, Modular's director of technical marketing, says: "Overall most end users found the programming compatibility in the Modcomp family and how far Modular has come over the past year a little difficult to believe at first. The prospects at each of the 60 or so demonstrations also always commented on the modern packaging.

"However, after the first couple of demonstrations," he continued, "you really almost forget about the prospect's application, the audience and the technical real-time considerations. What you think of as most important is: how many cracks does the prospect have in his ashtray? Will the computer have to be lifted up stairs? How many? Do the stairs wind? And you are always happy to greet loading platforms and elevators."

At a major tire company in Akron, for example, Modcomp was rolled into a conference room only 15 minutes before a scheduled demonstration. The computer a day earlier had been demonstrated at one of the big three automotive manufacturers.

As soon as Modcomp was switched on – it went down. Recalls Earl R. Clark, Modular's manager of customer engineering: "As the tire company's engineers and executives filed in for the presentation, Modcomp was still down. We then spent about 45 minutes watching our audience shift from one foot to another as we tried to troubleshoot the machine. We decided that we had a power problem and changed the power fail safe from 105 V to less than 95."

Modcomp immediately started operating. A company executive then spoke up: "We generally chatted a little nervously and the voltage is low. And we should have told you sooner."

At Oak Ridge a competitive sales representative inspecting Modcomp accidentally spilled his glass of scotch and soda all over the computer. As the competitor, two Modular sales engineers and a major customer chatted a little nervously they unintentionally kept dropping peanuts into the teletypewriter. But Modcomp seemed to thrive on scotch and peanuts.

The Modcomp III that will be at the SJCC did have a few problems, however. In the Midwest a light bulb burned out on a paper tape reader and later the unit was replaced due to a reading failure.

After the long and hard travels Modcomp must be looking forward to the three-day rest at SJCC.

Anglo-American Symposium

IBM Dominance Will Be Total, Grosch Tells Europeans

By J.H. Bonnett
CW European Bureau

LONDON – If the present situation does not alter radically, IBM could move from its present position of supplying 80% of the world's computer needs to totally dominating the world market by supplying 90% or more, Dr. Herbert J. Grosch said at an Anglo-American symposium here recently.

Grosch tore into the complacent manufacturers (including those of U.S. origin) and shook them with a picture of a "Great Grey Giant" ready to gobble up the remaining Dwarfs (Happy and Dopey having just been married). After all, if IBM holds 90% or more of the market, what other standards are required?

Grosch dismissed as futile attempts by the European companies to fight IBM by describing Germany's Siemens, France's CII and (for some equipment) Britain's International Computers Ltd. as licensees to companies that themselves were in no condition to fight IBM. Philips, said Grosch, was a laugh even in Holland.

If the UK wants to maintain a national mainframe manufacturer, the government must "squirt" hundreds of millions of pounds sterling for research and development into ICL, Grosch said.

Research contracts and guaranteed orders are not the way to keep the company a viable proposition, he said.

"ICL does not want government money for vast research and development projects," said an ICL man from the floor, "it wants government sponsorship only by means of a guaranteed outlet for the equipment it produces."

"It may not want cash injections for R&D," Grosch replied, "but that's what it needs. The top management are all old punch card men who cannot see the necessity of R&D and are really not the best men to run the company. Vast amounts of money are needed to enable the company to compete with equipment that will sell on the open market. And even then there is no guarantee that it will survive.

The Japanese

"The Japanese are at present the third world force in computing," he continued. With a home industry and market growing at a rate of about 35% per year it will soon be moving in force into world markets. This will be at the expense of the European-based companies first, then the smaller U.S. companies and may even cause IBM to react in some way."

When asked about what effect the Russians would have on world computing, Grosch said that they were so far behind that one couldn't even see them with a telescope – and they were falling even further behind because they don't have the know-how or the machines.

An ICL man from the floor said his company is the largest supplier of machines to the USSR – a profitable market for ICL – and is a market in which it will continue to survive.

It is no good suggesting that few outdated 1900 machines are going to help the Russians, Grosch said. What they need and what they would have if they could get them are machines like the 7600. If they are going to have centralized administration Gosplan should be carpeted wall-to-wall with 7600s. Since their computer use growth rate is only 15% per year compared to a world average of around 20%, they are going to fall further and further behind.

Grosch, when asked if he thought the Europeans and the rest of the world would sit back and let IBM increase its domination, especially in such an important industry replied that there was nothing they could do. There is no other company that combines the mixture of product and marketing so effectively as IBM, he said.

European News and Analysis

Grosch indicated that the U.S. Government is almost as perturbed as the Europeans at the prospect of IBM having total world control over markets, but is hesitant as to action. Splitting up IBM into five parts would give competitors five IBMs to fight, he said.

Saul Steinberg of Leasco advised Europeans to specialize. His message was that any company was foolhardy to challenge the might of IBM by being all things to all people.

Because the general acceptance of peripherals from the independents was high, Steinberg indicated worry about IBM's reaction.

Perhaps the Europeans should not be worrying so much about mainframe manufacture as software, Steinberg said, and Grosch agreed. This is one field the U.S. doesn't monopolize and the UK (and Europe) can be rightly proud of their contributions and achievements, they said.

The Anglo part of the Anglo-American symposium was hardly productive. Very little that was new was exposed and views (or non-views) put forward by Basil de Ferranti, director of ICL, did not exactly instill confidence in the company.

He thought that decisions that will affect companies in the European Economic Community were not so much economic as political, and as such, governments have the greatest of all responsibilities for the continuation of a viable European computer industry.

Concern was expressed by Dr. Stanley Gill over the forthcoming decisions that the Post Office will soon make over the services it will offer the DP industry with very little or no relevant research.

Donald Brosnan, chairman and managing director of Honeywell Information Systems in the UK, put forward his complaints of discrimination by European governments (and the UK's in particular) against companies such as his, which he thought should be regarded as indigenous companies when tendering for government orders.

DP Controls Batch Process Manufacture Of Networks on Ceramic Substrates

WASHINGTON, D.C. – Batch-oriented processing of networks on ceramic substrates fully controlled by a computer at 46 points in the process was described by C.H. Boyd, a Western Electric engineer, at the 21st Annual Electronic Components Conference here under the co-sponsorship of the Electronic Industries Association and IEEE.

The process involves the manufacture of thin film resistor networks on ceramic substrates by the company's North Carolina Works.

Included in the process are chemical and fire cleaning of ceramic substrates, deposition of a thin tantalum nitride resistive film overlayed by a three-layer conductive film for termination and the generating of conductor and resistor network patterns by photolithographic techniques.

All records required to control batch processing are maintained in the computer memory, including: batch status record, routing record, measurement data from automatic test sets, results of visual inspection of the networks and results from manually performed tests.

The basic system incorporates a computer in an area adjacent to the clean room manufacturing area. Twelve remote data terminals and six automatic test sets are on the manufacturing floor. They are connected to the computer by means of a captive, time-shared data link, consisting of a 16-line input bus, a 16-line output bus, 18 hardware interrupt lines, 20 enable lines and 10 control address lines.

Negative logic is used on the data link to increase noise immunity. Standard DTL-TTL logic levels are used throughout the system. BCD coding is used for all data input and output. The computer interfaces to the data link consists of a 16-bit output buffer register, 24 hardware interrupt inputs, 22 device enable outputs and 10 control address outputs.

Each data terminal and test set is directly connected to the computer by a dedicated interrupt line and a dedicated enable line.

WHAT'S AHEAD for the computer industry in the 1970's, as the recession draws to an end?

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EDP industry report

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Executive Changes Named at UCC

DALLAS, Texas – Douglass M. Parnell Jr. was elected chairman of the board of University Computing Co.'s subsidiary, Computer Technology Inc. (CT), and vice-president of UCC. Michael F. Sivinski succeeds Parnell as CT president and chief executive officer; he was formerly CT's vice-president, operations.

Executive Corner

E.W. McCain Jr., UCC executive vice-president, said that Parnell as UCC vice-president will supervise the operations of CT and the Data Link Division.

He succeeds McCain as CT chairman; McCain continues to serve as a CT director.

Other Moves

■ URS Systems Corp., San Mateo, Calif., has appointed Joseph C. Vierra president of URS Data Sciences Co., a division of URS. William Ross was named executive vice-president of Data Sciences.

■ Sci-Tek, Inc., Wilmington, Del., has named Walter W. Smock as vice-president, technical operations and Paul G.A. Carlson vice-president, marketing.

■ Ralph A. Swanson has joined Resortec, Inc., Mt. View, Calif., as vice-president, marketing.

■ Guy Icangelo has been elected to the office of regional vice-president, New Jersey, and Milton Ihrig has been named regional vice-president, New York, by Jersey Tab Card Corp., Union, N.J.

■ Dstotek, Inc. of Dallas has appointed Fred A Kinch vice-president for finance.

■ Dr. Norman H. Meyers has joined Spin Physics, Inc., San Diego, Calif., as vice-president, marketing.

■ Alfred W. Fera has become vice-president and general manger of Univac's Northern European Division. Geoffrey R. Cross succeeds him as vice-president and general manager of the Americas Domestic Division.

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Independent Retail Chains Lead Way in Automation

Special to Computerworld

SANTEE, Calif. – "Retail stores all across the country are more and more turning to EDP. They're using it to track their inventory item by item, for sales analysis, and for the automated processing of their receivables," according to Bernard Edelman, president of Information Machines Corp.

"Independent chains are leading the way in this trend toward automation," Edelman claims. "They have the flexibility to change, and their management can make decisions in areas of advanced technology."

One example of independent use is at E. Gottschalks & Co., California's third largest independent department store chain, which operates eight stores in the San Joaquin Valley. Six years ago Gottschalks management saw the potential of EDP in retailing and installed an NCR 315 in the basement of the main store in downtown Fresno.

Presently doing about $20 million in sales annually, the eight stores produce some 3,000 Kimball print/punch tickets per day, six days a week. The tickets contain numerically coded information about the item, and are used as data input for tracking sales transactions and for unit control of their merchandise.

Two types of print/punch tickets are in common use by retailers today. One is made by the Kimball Division of Litton Industries, and the other by the Dennison Manufacturing Co.

The key to automating the inventory system of a retail store that uses these tags is the automatic reading of the information the tickets contain.

To automatically read these merchandise tags, IMC has designed and built a machine that uses photo optics to sense the tickets.

Gottschalk's NCR 315 requires a paper tape input, so the Registron machine furnished by IMC reads the Kimball ticket and drives a Roytron paper tape punch machine.

John Wintemute, Gottschalks' EDP manager, has written a program for the automatic reading of the Kimball tickets. With it, the computer produces a sales analysis report sorted on the basis of department, class of merchandise, vendor, style, color and size. The report comes out daily.

Next step for Gottschalks and other similar stores is the use of a Registron-type machine at the point-of-sale.

In the standalone configuration at the point-of-sale, Registron writes the details of the sales transaction on a 1/8 in. tape cassette built into the machine. IMC can supply translators which read up to 16 cassettes at a time, and pool the data onto an IBM compatible 9-track tape, at high speeds.

The logical step after stand-alone operation is an on-line system, but Edelman does not see it coming in the immediate future. "Retailers want to keep complete control of their systems now," he said. "There have been too many scare stories about on-line systems that have not worked out, and stories about computer breakdowns in general. These people are careful with hardware. They won't put their whole retail operation on-line with equipment they do not know to a computer that they don't really trust. Not yet."

What's the future for EDP in retailing? "Up," Edelman answers, "only up. Even after the GE failure with the system for J.C. Penney, one of Penney's vice-presidents said that such systems were the wave of the future for retailers."

Expansions

FAIRFIELD, N.J. – Digital Computer Controls, Inc. is expanding to new, larger plant facilities at 12 Industrial Road. The present plant at 23 Just Road will be retained as the headquarters for Digital's operations in engineering and software support services.

Company officials said the expansion is necessary to meet increasing demands for its general-purpose minicomputers. The new plant has six times the production area of the company's present plant and contains larger office facilities.

Other Expansions

Peripheral Equipment Corp., Chatsworth, Calif., has expanded its representation in Europe. Electronics Decibel SA, located at Pillar de Zaragoza 108, Madrid 2, Spain, will represent PEC in Spain and Portugal. Soviet Import/Export Inc., at 59 Central Ave., E. Farmingdale, N.Y., will have sales responsibility for Eastern Europe.

Data Facilities Management, Inc., Stamford, Conn., has announced the formation of a wholly owned subsidiary, DFM Associates, Inc., to provide DP consulting, software development and program packages to banks and other financial institutions.

A new addition containing 46,000 sq. ft., to be used for manufacturing and assembly operations, is being added to the plant of Univac on Shepard Road and W. Seventh Blvd. in St. Paul.

Boeing Computer Services, Inc. has opened a new sales office at 2600 El Camino Real, Palo Alto, Calif.

Contracts

Delta Date Systems Corp. is supplying 65 Teleterm 1 display terminals to the State of Washington, Department of Social Health Services, Division of Public Assistance.

Nasa has selected Computer Sciences Corp. to develop the detailed design for a key software system capable of controlling all of the on-board computer systems planned for this country's space station.

National Sharedata Corp. of Dallas has entered into an agreement with the Citizens National Bank of Lubbock to assume the management of the bank's DP operation and computer center.

The Tampa operations of Honeywell Information Systems has been awarded a $1-million Air Force contract to design, build and test a high-speed data modem for possible use by the Defense Communications System.

Di-An Controls, Inc. of Boston has received a contract, valued at about $100,000, from Raytheon Co. for ticket printers to produce airline boarding passes.

State Planning Official Speaks

Soviets Concede DP Gap With West, Plan to Close It

MOSCOW – Soviet officials have conceded that they are behind the West in the production of advanced computer systems, but contend that articles in the Western press exaggerate the gap, according to reports in the New York *Times*.

At the same time, Mikhail Y. Rakovsky, a deputy chairman for the Soviet State Planning Committee, said that his country was seeking to "narrow the gap by concentrating on the development of a few standardized models, thus sharply reducing production costs" of computer equipment, reported Theodore Shabad in the *Times*.

One recent report [CW, March 17] by Dr. Barry W. Boehm, head of the Rand Corp.'s Computer Systems Analysis Group, contended that the Soviets have the "raw technical potential to achieve something near parity in computing with the U.S. within 10 years."

At the same time, Boehm had contended that the Soviets needed more centralized planning by government, science and industry to provide systems oriented more effectively to the needs of general users.

He reported that "as long as this centralization is not carried out, I think the U.S. will stay comfortably ahead in computer technology and usage. However, our lead in space and military applications will probably be less than our lead in general-purpose computing."

Rakovsky, who heads the State Planning Committee's main computer center, said that the third generation of computers, which appeared in the U.S. in 1964, would go into production in the Soviet Union during the five-year plan that started this year.

He indicated that the Soviets would produce 12,000 to 15,000 third-generation machines during the five-year span.

Computer production in 1975 is scheduled to be 2.6 times greater than last year, according to a published outline of the plan quoted by the *Times*. That would put Soviet computer production at the 3,000 unit per year level, up from 1,200 produced yearly at the present.

Rakovsky disputed Western estimates that put it in fifth place among computer-using nations, behind the U.S., West Germany, UK, and Japan. According to the *Times* article, he questioned Western estimates of 5,500 to 6,000 for the number of Soviet computers in use, but did not offer any alternative figures.

Hanover Trade Fair Lures American, European Firms to Competition

CW European Bureau

HANOVER, West Germany – American and European firms vigorously contested for the buyers' attention at this year's Hanover Trade Fair, as competition built up for orders in the European market.

Highlights of the show included the NCR 270 banking terminal, demonstrated publicly for the first time in Europe. The 270 is expected to be available in June at a local price of $109,200 and NCR has already received orders from France and Switzerland. Also of interest was the 280 point-of-sale system shown for the first time.

In retail merchandising, which is expected to boom rapidly, NCR is pressured from Olivetti which has already installed advanced systems using the 600 series of terminals in Germany.

Cogar Corp., which launched a European subsidiary in February, was a first-time exhibitor with the System 4 intelligent terminal and attracted attention despite the gloom following the layoffs of 50% of its U.S. staff last month.

IBM demonstrated publicly the 370/145 for the first time in Europe, together with System/3 Model 6. Other major U.S. companies were showing well established equipment lines, as were the European companies.

There was speculation of an expected deal between CDC and the German firm, Nixdorf, which made its reputation with small-scale visible record computers. Neither CDC nor Nixdorf would comment on the reports.

The general impression was that while the exhibition was very busy, the buyers were delaying their decisions as long as possible in the face of a slight but noticeable economic slowdown in Europe.

Technical highlight of the show was a computer display only 20 centimeters deep on the AEF Telefunken stand. It operates in electroluminescent elements, each capable of displaying 63 characters, and is available in a variety of sizes from 20 mm square to 100 mm square.

Calcomp Hails On-Site Support for Success In Japanese Market

NEWPORT BEACH, Calif. – Dr. Richard I. Tanaka, vice-president/program development, California Computer Products, Inc., told the Western Electronic Manufacturers Association that Calcomp's successful penetration of the Japanese market is primarily attributable to full on-site company support in the areas of sales, maintenance, software and training.

"When we appointed Yoshizawa Business Machines as our exclusive distributor, there were only a few Calcomp plotting systems in Japan," he said. "Shortly after the appointment, we formed a subsidiary, Calcomp Pacific, headquartered in Tokyo, to provide complete support services to YBM and the customers.

"Today the Japanese market accounts for a major portion of Calcomp's international market, which represents about 30% of total annual sales."

Farrington Abandons OCR Manufacture

CW Washington Bureau

SPRINGFIELD, Va. – Farrington Manufacturing Co., a pioneer in the OCR business, has decided to discontinue manufacture of its optical character recognition equipment.

The company, however, said it would continue sales and service of the equipment, although it could seek to subcontract these facets of its business to another company.

"We'll consider any alternative," said John W. Davidge Jr., the court-appointed trustee for the firm currently in federal bankruptcy reorganization proceedings.

Farrington hopes to distribute OCR equipment for other manufacturers, though, and to put increased emphasis on manufacture and sales of imprinters.

The discontinuance of the OCR line is an effort by the Springfield firm to conserve cash. The manufacture of this equipment represents about 20% of its total annual revenue.

Store Uses Memorex Units for 2314s

FRAMINGHAM, Mass. – Zayre Department Stores, the site of the first IBM 370/155 installation, has replaced two 2314 disk systems with Memorex 3660 file subsystems. One of the Memorex units is being used with the 370/155, while the other is attached to a 360/50.

The company had planned to hold off replacement of the 2314s until the IBM 3330 system became available, but plans were changed by a financially attractive offer made by Memorex, a Zayre spokesman told CW.

The Memorex drives were accepted on a short-term, month-to-month basis, he continued. The company plans to keep the Memorex drives until September when it will receive its 3330 drives, he said. In that interval, the company will save about $25,000, he added.

Improved performance specifications were also responsible for the shift to the Memorex units, the spokesman said. Although the company has not specifically verified the accuracy of the claims, improved throughput seems to bear out the promises, he said.

State of the Arts

Vertical displays in Arts III computer-aided air traffic control system are shown during testing for operational use at Chicago's O'Hare International Airport. The data entry and display subsystem is provided by Texas Instruments, Inc. under subcontract to Univac, prime contractor, which uses a specially designed 1230 as the major computer.

HCR Systems Enters DP for Real Estate, Hotels, Construction

CAMBRIDGE, Mass. – HCR Systems Corp. has been formed at 575 Technology Sq., to specialize in computer consulting services, systems contracting and the development and marketing of proprietary software for hotels, construction firms and real estate agencies, according to James. H. Young Jr., president.

For the hotel industry, the firm has developed and is marketing management information systems for accounting, budgeting and reporting. In addition to these activities, the firm offers hotel labor reporting and payroll systems.

In the area of real estate, HCR is marketing property management systems for building managers which provide reports on operations for rentals, billings and accounts receivables.

The primary objectives of the firm are to take over complete installation of computer systems for companies, and supply operational and programming services at a savings to the client.

Emerging Enterprises

Other New Companies

Datagraphics, Inc. is a new firm specializing in advanced electronic phototypesetting with main offices at 31 Lewis St., and computer installation at 95 Woodland St. in Hartford, Conn. The company, whose services are built around an RCA Videocomp computer, provides camera-ready copy in a variety of type faces and sizes.

The Edumatics Corp., with headquarters in Oceanport, N.J., has announced its formation and entry into the field of computers and education. The new firm initially will offer consulting services and develop specialized materials for use in computer education and training.

Automation Services Corp., with offices at 182 Forbes Road, Braintree, Mass., has been formed and offers contract engineering, programming and consulting services in addition to computer service bureau operation.

A new document storage and retrieval system firm, Automatic Information Retrieval Inc., has been formed in Palo Alto, Calif.

William Brothers Co. and National Bank of Tulsa have merged their computer departments to form the starting basis of The Mentor Corp., a new, Tulsa-based computer services firm.

Curtis Builds Programmer for 256-bit ROM

Discstor 510 From GI

Integrated's Capacitive ROM

MOUNTAIN VIEW, Calif. – A table-top programmer for the new Signetics 8223 256-bit Field-Programmable Read-Only Memory from Curtis Electro Devices sells for under $200.

The PR-23 programmer provides a row address selector and lamp indicator for each of the eight-column outputs. The instrument normally rests in the VERIFY mode where the memory may be scanned by indexing address thumbwheels. For programming a new memory, a truth table is prepared and placed in a slot at the rear of the control panel.

To place a logic 1 into the memory (blank memories contain all logic Os), the operator moves the appropriate output switch to a preprogram position, then momentarily closes the function switch to place the logic 1 permanently into the memory.

The Signetics N8223B Field-Programmable 256-bit Read-Only-Memory is priced at

New OEM Products

$30.60 for one to 24 units from Box 4090, 94040.

Rotating Memory System Interfaces With Mini

HAWTHORNE, Calif. – The Discstor 510 memory system, with removable disks, provides an interface with General Automation's S.P.C. 16 minicomputer. The mass memory system, from the Systematics/Magne-Head Division of General Instrument Corp. stores 5 Mbits or 300,000 16-bit words on line in its maximum configuration; it is also available in 75,000 and 150,000 word capacities.

An additional 300,000 words are available on the same disk by turning the disk over. The average access time of this head-per-track unit is 8.5 msec., according to the firm at 13040 South Cerise Ave., 90250.

Capacitive ROMs Available In Standard Modules

WILMINGTON, Mass. – Integrated Memories Inc.'s series 1000 Capacitive read-only memory (Crom) systems include input buffering, address decoding, storage array, output data register and timing and control. A memory capacity of up to 131K bit/module is standard. Increased memory can be achieved by stacking modules.

The systems are DTL/TTL compatible and consume less than 400 μW/bit. Access times and cycle times from μsec range down to 125 nsec or less are available. Bit costs of under 2 cent/bit are available from the firm at 260 Fordham Road, 01887.

Keycomp 700 Programmable

WILMINGTON, Mass.— A programmable keyboard, the Keycomp 700 by Photon, can store widths for eight distinct type styles and up to six different formats.

Operator aids for the Keycomp 700 include a digital display of line length, type style and size.

The firm is at 355 Middlesex Ave., 01887.

Microprogrammable Mini Stores Logic In Control Memory

SANTA ANA, Calif. – Microdata Corp. has introduced a microprogrammable minicomputer which stores logic in an integrated circuit control memory. The Micro 1600 has both single and dual CPU configurations and can employ large or small read only memory arrays.

Three control memory configurations are available: the Brom (bipolar read only memory), Prom (programmable read only memory) and Arom (alterable read only memory). Brom is for hard-wired permanent installation of debugged and field proven routines. Prom permits microprograms to be installed st the field or factory level. Arom permits the debugging of microprograms in a real-time environment prior to implementstion into the more permanent Brom or Prom systems.

There are 32 general-purpose file registers which are implemented with MSI/LSI semiconductor devices. Under program control, these registers can be assigned the function of buffer register, accumulator, index register or program counter.

Micromemory capacity is up to 16K words, Cycle time is 200 nsec. Main memory can be expanded to 65K bytes. Magnetic core configurations are available in 4K by 8 and 8K by 8 modules. Main memory has a 1 μsec cycle time.

Packing variations permit operations ranging from a stripped down minicomputer with two printed circuit boards and a card cage to a computer utilizing the dual-processor capability.

Price for the basic systems package is under $5,000. From the firm at 644 E. Young St., 92705.

Plated Wire Memory Contains .005-in. Wire

DENVER – Plated wire is still alive and kicking with Nemonic Data Systems, Inc.'s introduction of the NM-6000, an electrically alterable read only plated wire memory (Earom).

The NM-6000 Series memory features a magnetic thin film plated on .005-in.-diameter wire (Nemonic's NW-100 plated wire) which operates in the nondestructive readout mode. Maximum capacity of this family is 81,920 bits. Other features include a cost of 3 to 5 cent/bit; nondestructive readout expandable from 512 words to 8,912 words, variable word with sizes up to 40 bit/word; a 650 nsec readout; and a 180 nsec access time.

The modularity designed into the stack and circuits, permits the series to be configured into a system consisting of 1K to 4K words by 8 to 40 bits per word.

The firm is at 1301 West Third Ave., 80223.

260,000 Points, Color, Too

Large Display/Memory Panel Uses Plasma Techniques

PHILADELPHIA -- Development of an 8-1/2-in. square plasma display/memory unit, said to be the largest ever produced, was reported here recently. The Digivue display/memory panel, containing more than 260,000 discrete discharge sites or junctions at a density of 3,600 sites/sq in., was developed by Owens-Illinois, Inc. The panel includes two perpendicularly arranged panels with 512 parallel electrodes on each, with a resolution of 60 line/in.

The development was described at the 1971 International Symposium and Exposition of the Society for Information Display here, by W.E. Johnson and L.J. Schmersal. The large display includes resistor diode multiplex driver and sustaining circuitry that employs new techniques to reduce the number of active circuits from 1K to 96, they said.

The term plasma stems from the panel's unusual design in which a composite 1/2-in. thick panel is comprised of a sandwich of two glass plates separated by an inert gas which in the ionized state forms a plasma. In the Digivue display/memory panels, metallic conductors are deposited on the two sheets of glass and are coated with thin dielectric layers.

The sheets are then mounted opposite each other with a gas spacing between and their conducting lines at right angles forming a matrix. Digital signals select the appropriate matrix intersections for illumination to form the alphanumeric characters and graphic symbols displayed on the panel.

In the plasma display technique, the "on" state condition of all previously written junctions of the matrix is maintained by the application of a periodic sustaining voltage, which is applied to all junctions in the panel. For a junction that is in the "off" state, the voltage is too low to ignite a discharge.

Each display junction or dot in this matrix can be selectively written or erased by application of the proper address pulse voltage to a selected orthogonal row column pair of conductors.

The 512 by 512 display unit employs four 16 by 16 resistor diode matrices, each capable of controlling 256 lines on the panel. This technique is said to have an advantage over "driver-per-line" circuitry because it reduces the number of drivers required from 1K to 96.

Colored Panels Developed

The successful development of a Digivue display/memory plasma panel capable of displaying three colors of red, blue and green, and three shades of green, was also reported at the show by Owens-Illinois.

Three-color panels of 33-1/3 line/in. resolution, measuring 4 in. by 4 in., have already been built and are in operation, Felix H. Brown reported. Work is under way to extend the techniques to larger panels of 60 line/in. resolution, measuring more than 15 in. in length and width, he added.

Digivue Display/Memory Panel

The selection of phosphor materials for use inside the 1/2 in.-thick glass panel required consideration of the mode of excitation, chemical compatibility with the materials of the panel, stability in the conditions of fabrication and survival in the plasma environment.

"The thermal cycles required for panel fabrication and the composition of the dielectric glass led to the choice of oxygen-dominated phosphor materials. A green zinc-silicate, a blue calcium-tungstate and a red yttrium-vanadate were selected as the most promising phosphors," Brown noted.

Nickels & Dimes

Vlatron is officially in Chapter 10 bankruptcy. The newly appointed trustee is R. Robert Popeo, a Boston attorney, who said he will present the federal court with a reorganization plan "some time in June," and that he has obtained financing that will enable the terminal maker to stay in operation "indefinitely." Popeo refused to disclose the source of the money. He also said that Vlatron now employs 17 people, down somewhat from 1,100 a year ago.

$$$

From the **Boothe Computer** annual meeting: Chairman D.P. Boothe Jr. expects the year to be "quite profitable" due to "the combination of somewhat lower prime rates and reduction of bank debt."

$$$

Hazeltine has finally admitted defeat in its patent litigation with Zenith Radio, and will pay Zenith $22.5 million in cash and credits. Settlement of the 13-year old suit and countersuit calls for a $16.5 million cash payment, starting with an immediate $8.3 million chunk, and deferred payments over five years. In addition, Hazeltine will give Zenith a $6 million credit on patent use.

$$$

duPont, Glore Forgan, Ross Perot's new acquisition, had an operating loss of $17.7 million in 1970, according to New York Stock Exchange officials. The deficit is believed to be a record for a brokerage house. The word is that there may be up to $55 million more in losses due to misplaced securities for customer accounts. Perot recently sold 900,000 of his shares in Electronic Data Systems to raise over $55 million for the acquisition of duPont. This reduces his EDS holdings from 72% to 63.2%.

$$$

The National Association of Securities Dealers is considering offering nonmembers Level II Nasdaq service. This would enable them to see market-makers' actual bids on Nasdaq-listed stocks. So far nonmembers can have only Level I service, which shows just the median bid for each stock. The fee for the extra service would be $75, which would go to the NASD.

CDC's Turnabout Shows Shaky Basis for Profit

By Michael Merritt
CW Staff Writer

MINNEAPOLIS – Control Data Corp.'s recent first quarter earnings statement requires a bit of explanation.

On the surface it would seem that the beleaguered maker of supercomputers has had a turnaround. In the first quarter of 1970, before adding in the earnings of CDC's financial arm, Commercial Credit Corp. and other affiliates, computer operations had a $6.6 million loss, after interest, tax and extraordinary charge adjustments.

In 1971 the same line on the earnings statement showed a profit from computer operations of $1.4 million, including a $711,000 extraordinary item.

A turnaround in computer operations, right? Well, not quite.

A note to the statement reveals that since the beginning of the year CDC has stretched out its depreciation schedule for computers from four years to five and six years.

Again according to the note, this has "had the effect of increasing net earnings . . . [for the quarter] by approximately $2.2 million (15 cents a share)."

This would reduce net earnings before Commercial Credit from $1.4 million profit to an $800,000 loss.

Excluding the $711,000 extraordinary item, the net earnings become a net loss of $1.5 million.

Turnaround? It is a lot better than a $6.6 million loss, certainly, but it's a mighty shaky profit on which to base CDC's recent stock market performance. CDC common has sold for over 75% above its 1971 low of 47, and recently has been going for 72, a fine performance for a finance company carrying an unprofitable computer maker.

Sales in the quarter rose not quite 10%, from $80.1 million to $87 million. Rental and service income did even better, going from $44.6 million to $53.7 million, so total non-Commercial Credit and affiliate income jumped from $125.5 million to $141 million – a good performance.

Because of better cost control, gross profit bounded from $24.5 million to $42 million.

But general administrative expenses, interest expenses and R&D expenses all were up marginally, so in order to show a profit from computer operations, depreciation changes and extraordinary items are necessary.

The real killer was interest expenses. From an operating profit of $10.7 million, CDC had to subtract "interest and other deductions" of $10.1 million.

Since CDC was operating at a loss in 1970, it had tax credits rather than deductions, so there is no way of comparing the company's tax position.

Commercial Credit is what has saved the company from seas of red ink once again. In the 1971 quarter CCC supplied earnings of $12.2 million, while, after losses from affiliates and dividends on preferred are deducted, the net earnings applicable to common for the combined operations are – $12.2 million.

Net per share earnings for the quarter were 85 cents, but five cents of this came from extraordinary items, and, as the note reveals, 15 cents came from the depreciation change.

If one were to try to compare earnings per share with an earlier quarter, one might be advised to use 60 cents a share rather than 85 cents, just running this out to four quarters would indicate a year per share of $2.40, giving CDC a current market multiple of around 30.

Which is doing pretty well for a finance company.

Things are much better at CDC this year than last; sales are up, and expenses seem under much better control.

But there are problems, too. CDC traditionally is more oriented toward outright sales than rentals, which robs it of the beautiful flywheel that IBM has for example. It is saddled with a large debt service. It is committed to some fairly expensive R&D. And it has an expensive, esoteric product line whose sales can be sharply hurt by cutbacks in federal budgeting.

In the last year CDC has taken steps to ameliorate the last problem and attempted to make its computer product line more tempting to commercial users. There is still a recession going on, however, which makes machines difficult to sell, and competition against CDC machines in commercial applications can be brutal.

So CDC is in an interesting position, with great possibilities as well as great difficulties.

COMPUTERWORLD

financial

Datatab Returns to Profitability

NEW YORK – Datatab, Inc. informed shareholders at its annual meeting that it has returned to profitable operations, a pattern that had been interrupted by expansion moves made in the face of last year's economic decline.

Chairman Gerald Yass told shareholders that all divisions of the multidata center computer service company had returned to profitability but pointed out that "earnings for the first quarter would have even been higher if unused office space contracted for in last year's expansion program had been subleased during the recent period."

He noted, however, that a portion of the surplus space had been leased in April 1971 and added that "we are optimistic about subleasing the balance in light of the improving real estate market."

In spite of these additional costs, Datatab, he said, showed a 59% gain in first quarter profits over the comparable 1970 period. Net income, he reported, advanced to $43,049, equal to eight cents per share, from earnings of $27,006 or five cents per share in the corresponding quarter of last year. Total revenues rose 9.1% to $1 million from $927,455 in the comparable three months of a year ago.

Commenting on the turnaround, Yass said that the earnings uptrend is expected to accelerate in future quarters, based on the cost control program now in operation and new business recently booked.

In answer to a shareholder's question, Yass stated that the company would seek American Stock Exchange listing.

UCC Tells How to Turn $4.2 Million Profit to Loss

By a CW Staff Writer

DALLAS – Most everyone has wondered at one time or another how to change a $4.2 million profit into a $937,000 loss. There is now available a how-to-do-it book on just this subject. Entitled First Quarter 1971 Earnings Report by the University Computing Co., it details the restatement of first quarter, 1970 earnings.

UCC's opus revolves about accounting technique changes, a highly popular subject in financial circles these days.

UCC also manages to include a section on turning the corner, revealing that it achieved profitability in the first quarter of 1971 to the tune of $1.5 million, or 21 cents a share, after putting into practice all its accounting changes.

UCC's first period, 1970 profit is $4.2 million, as originally stated. As was common practice in 1970, those earnings were based on a good deal of capitalized R&D, as well as capitalized installation costs.

Since this has been a good year for washing out questionable capital items, UCC, like many other companies, has moved to the more conservative accounting practice of expensing these costs. The restatement cost UCC $4.1 million.

Exclusion of sold and discontinued operations cost another $5.3 million.

And ownership of Computer Technology has gone up from 35.5% to 71%, so UCC, as of the fourth quarter of 1970, has been consolidating CT's operations.

Presto, a $4.2 million profit in 1970 becomes a $937,000 loss.

The books are clean, accounting conservative, everybody's happy.

For the 1971 quarter operating revenues hit $34.1 million, up from $29.2 million last year.

In the 1970 quarter operating income was $3.5 million after the restatement. This is $1.8 million more than the 1971 quarter's operating income.

UCC Chairman Charles J. Wyly Jr. said the drop was caused by a decline in equipment sales. He also said new orders entered were at an all-time high – exceeding in the first quarter all of the orders for 1970 – even though shipments were down.

On the insurance side of the company, the first quarter produced an underwriting profit for the first time since the companies were acquired in 1968.

Wyly also noted he expects a decision from the FCC on the Datran subsidiary's petition to establish a data transmission network some time this year.

WU Quarter Earnings Drop $2.4 Million

NEW YORK – First quarter earnings of the Western Union Corp. plummeted from $7.2 million in 1970 to $4.8 million in 1971. Revenues shrank slightly from $98.4 million to $92.4 million.

On a per share basis, earnings fell from 72 cents to 45 cents.

Earnings were weak "primarily because of a continued weakness in the national economy which affects our public message volume," noted President Russell W. McFall. WU expects business to improve as the year goes on, he added, and foresees "growth in earnings from our newly acquired TWX business . . ."

The subsidiary, Western Union Telegraph Co., had a net income in the first quarter of $5.5 million on revenues of $91.8 million, both down from $7.9 million and $98.1 million in the first quarter of 1970.

The profit of the subsidiary was greater than that of the parent because of preferred dividend payments and accounting changes.

Western Union recently acquired American Telephone and Telegraph's TWX Teletype system, and is in the process of combining it into the WU Telex system.

NCR to Cut New Plant Costs in '71

DAYTON, Ohio – The National Cash Register Co.'s 1971 capital expenditures will be approximately $179 million, according to John J. Hangen, vice-president, finance.

"This year's total will be down 18% from the $218 million capital expenditures program of 1970," Hangen said.

By far the largest allotment of funds will be for NCR business systems, chiefly computers, which the company in turn rents to customers. Total rental equipment expenditures for the year are expected to be $113 million.

Domestic Decline

Hangen said expenditures for property, plant and equipment outside the U.S. would be about the same as last year but that there would be a sizable decline in domestic expenditures for that purpose.

"In 1970 NCR had an unusually large investment of $19 million in new domestic facilities, including a new corporate educational center at Dayton, Ohio, a major addition to our Data Processing Division manufacturing facilities in California, and several other large projects. In contrast expenditures for land and buildings in the U.S. this year will be about $4 million," he noted.

Optical Scanning Shows 9-Month Loss

NEWTOWN, Pa. – Optical Scanning Corp. reported a consolidated loss for the nine months ended March 31 of $994,463 or $1.81 per share, compared with earnings of $230,850 or 42 cents per share (including tax benefits of 13 cents per share) for the same period a year earlier.

SDC Reports Earnings Rise, Sales Drop

SANTA MONICA, Calif. – System Development Corp. (SDC) has reported earnings of $657,000 and sales of $34.1 million for the first nine months ended March 27, 1971. This compares with a loss of $14,000 and sales of $42.7 million for the similar period last year.

For the third quarter, net earnings were $20,000 and sales were $11.3 million. During the last fiscal year, SDC reported a third quarter loss of $171,000 and sales of $14.5 million.

The earnings were influenced materially by an extraordinary item, a tax loss carryforward, which was used up early in the second quarter. Other factors contributing to the increased earnings have been lower administrative, research and development and sales costs.

According to SDC President Wesley S. Melahn, sales in the Public Systems and Commercial Systems Divisions reflect significant growth. During this quarter, the Public Systems Division received a $3.6 million contract, the largest fixed-price award from a public agency in SDC's history, to engineer, develop hardware and install a computer-assisted communications system for the Los Angeles Sheriff's Department.

Melahn pointed out, however, that a decline in some areas of the military market more than offset public and commercial sales increases. As a result, he added, overall corporate sales are down 20% from last year.

Sarnoff Hopeful for 2d Period

NEW YORK – Second quarter earnings should be up at RCA, and the second half of 1971 should continue strong, according to a prediction made by Chairman Robert W. Sarnoff at RCA's annual meeting.

Part of the reason for the optimism, Sarnoff said, is that RCA is making "the largest investment in its history" to establish a strong position in the computer industry. "We've made important progress in 1970," Sarnoff told shareholders. "We continue to expect to achieve profitability in the early '70s."

Sarnoff noted that while electronics and communications are still RCA's "lifeblood," recent acquisitions have proven valuable to the company.

"During the past five years, RCA's total annual revenues have increased nearly $900 million. More then three quarters of this growth has been generated by increased diversification," Sarnoff said. "The growth rate of these new activities outstripped by a wide margin our more mature businesses.

"In fact, without the diversification of the past five years, we probably would have had virtually no sales growth and substantially lower profit," he said.

RCA also has grown world-wide, with net sales of its foreign subsidiaries in 1970 rising nearly 23% over 1969, Sarnoff reported.

Acquisitions

The proposed merger of Autocomp, Inc., Bethesda, Md., and Technetics, Inc., Rockville, Md., has been approved by the firms' boards of directors. Autocomp specializes in photocomposition and computerized information systems, while Technetics provides DP services primarily in the areas of health and education.

Tymshare, Inc., Palo Alto, Calif., and Graphic Controls Corp., Buffalo, N.Y., have agreed in principle to the purchase by Tymshare of the time-sharing business of Graphic Controls' Computer Systems Division, for 150,000 shares of Tymshare common stock.

Central Data Systems, Inc. (CDS), Cleveland, Ohio, has agreed in principle to acquire Pittsburgh Computer Co. for an undisclosed number of CDS shares.

Computer Financial, Inc. (CFI), Los Angeles, has acquired the Datatron Disc Division of H.F.S. Manufacturing Co., subsidiary of Datatron, Inc., Santa Ana, Calif. The division will operate as CFI Memories, Inc.

First Business Computing, Houston, has acquired controlling interest in Matrix Computing, Inc., a Lubbock, Texas, DP services firm, which will be operated as a wholly owned subsidiary. First Business Computing specializes in the development and application of computer systems and programs.

Magnetic Head Corp. has agreed in principle to acquire Data Magnetics Corp., Torrance, Calif., manufacturer of disk recording heads and ferrite products. The agreement is subject to approval by the boards of directors of both companies and Data Magnetics' stockholders.

Computing & Educations Systems Co. and its subsidiary, Graphic Arts Laboratories, Inc. have undergone reorganization by which they have become wholly owned subsidiaries of a new company, Technigraphics Corp. The company and its subsidiaries, all of Dallas, will provide computer services in the graphics and printing field.

Acme-Divac Industries, Inc. has acquired a line of CRT display terminals including associated polling controllers and magnetic tape cassettes from American Data Systems, Canoga Park, Calif. Acme-Divac, which designs and manufactures switching devices for the aerospace industry, has formed a new division, the Data Systems Operstion, to manufacture and market the new products.

Ohio Decorative Products, Inc. has acquired Croname, Inc., Niles, Ill., from Control Data Corp. A manufacturer of printed circuits, Corname will operate as a division of Grand Sheet Metal Products, Inc., Melrose Park, Ill., a subsidiary of Ohio Decorative Products.

MDS Has Accounting Changes, Backlog

KING OF PRUSSIA, Pa. – Speaking to a group of security analysts, Mohawk Data Sciences President Richard P. Rifenburgh revealed an impressive backlog for MDS's 2400 and 2501 systems, and disclosed accounting changes that will hurt MDS's earnings.

As of the beginning of April, firm contracts for seventy-five 2400s and eighty 2501s had been booked, Rifenburgh said, and total end-user backlog stood at $44 million.

Three months earlier Mohawk had reported a backlog of $35 million, so contracts worth $9.3 million had been signed in the three months. The 2400 had been announced about six weeks before Rifenburgh spoke.

It was also revealed that there are additional letters of intent totalling $7 million for 2400s and 2501s not included in the $44 million figure.

Rifenburgh said that the commitment of corporate resources to the 2400, combined with the effects of the recession will hurt upcoming earnings, but declined to name a figure.

Mohawk will definitely be moving its fiscal year-end from July 31 to April 30 to conform with the practices of Atron Corp., which Mohawk has just acquired, and Colorado Instruments, which it will purchase in June.

In an interview, MDS executive Vice-President Wayne Wells said earnings for the truncated fiscal year "will undoubtedly be less" than the $2.3 million – 43 cents a share – MDS earned in the six months ended Jan. 31. In other words, there was a loss in the last quarter.

Rifenburgh noted that MDS is considering other accounting changes, including creation of reserves for Model 1100 data-recorders off-lease, accounts receivable, inventories and changes in accounting for previous sales of equipment to third-party lessors.

MDS no longer sells to leasing companies, a practice that produced revenues of about $1 million a quarter for seven quarters.

According to Wells, MDS has decided to account for third-party sales as financing rather than sales. The adjustment would apply to previous years.

Wells said this change would reduce nine-month earnings by 10 to 12 cents a share.

Since Atron is operating in the red, it will subtract "a few cents a share" from earnings, too, the vice-president noted.

Rifenburgh revealed that MDS's bank line of credit has grown from $50 million to $55 million, of which $28 million is available in foreign currencies. He also said that shipments were at their highest since December 1969.

The president cautioned, though, that since the majority of equipment is on three- to five-year lease, the increase in shipments will become an increase in earnings only after some time.

The punched card stock certificate in the foreground replaces the hard-to-handle printed certificate at Reliable Investors Corp.

Punched Card Replaces Traditional Certificate

MADISON, Wis. – A Wisconsin corporation has broken with a tradition which in recent years has become an increasingly difficult problem for Wall Street.

Reliable Investors Corp. is using computer-produced punched card stock certificates, eliminating the traditional engraved, larger-sized certificate.

"The stock exchanges have been researching the possibility of transferring all of their stocks to punched card certificates for some time," said President George Stewart. "But as far as we know, we are the only company presently issuing certificates on punched cards.

"We've reduced our certificate printing costs by about 60% and realized a one-time savings of more than $40,000 when we recently reissued our stock. We obtain a number of other cost-saving byproducts from the new system, including a stock register for filing with various regulatory bodies.

"The punched card is simple and efficient," said Stewart, "and it has reduced our stock certificate storage requirements by 75%. The ease of entering information into the certificate file and getting it out again is fantastic."

The company uses a 360/20 to produce the certificates.

Earnings Reports

ADAMS-MILLIS
Three Months Ended March 31

	1971	1970
Shr Ernd	$.22	$.21
Revenue	11,209,922	12,903,471
Earnings	422,691	574,415

GREYHOUND COMPUTER CORP.
Three Months Ended March 31

	1971	1970
Shr Ernd	$.22	$.20
Revenue	11,900,000	12,400,000
Earnings	939,000	858,000

REYNOLDS & REYNOLDS
Six Months Ended March 31

	1971	a1970
Shr Ernd	$1.83	$1.72
Revenue	24,681,026	23,554,762
Earnings	1,889,118	1,630,348

a-Restated by company.

APPLIED DATA RESEARCH
Three Months Ended March 31

	a1971	1970
Revenue	$1,832,489	$1,352,727
Loss	145,206	306,007

a-As of Jan. 1, 1971, the company extended the estimated useful lives for calculating amortization of its proprietary software packages from three years to five years. The change had the effect of decreasing the net loss for the quarter by $71,000, or seven cents a share.

GRAPHIC CONTROLS
Three Months Ended March 31

	1971	1970
Shr Ernd	$.16	$.29
Revenue	5,265,053	5,635,008
Earnings	332,716	240,138

WABASH MAGNETICS
Three Months Ended March 31

	1971	1970
Shr Ernd	$.02	$.16
Revenue	5,879,421	7,323,747
Earnings	40,426	278,138

STANDARD REGISTER CO.
Three Months Ended April 24

	1971	a1970
Shr Ernd	$.37	$.66
Revenue	28,887,317	27,635,056
Earnings	787,451	1,413,629

TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE*QUOTES, INC. Cambridge, Mass. 02138

CLOSING PRICES THURSDAY, MAY 13, 1971

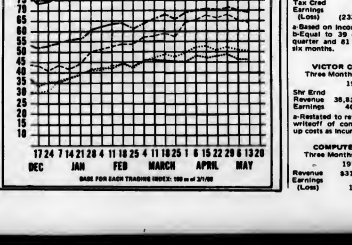
E X C H		------PRICE------ 1971 HIGH	CLOSE BID	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	9- 1/4	1 1/2	- 1/8	-7.8
A	APPLIED DATA RES.	5- 1/2	7 3/4	-1 1/8	-12.8
A	APPLIED LOGIC	1- 0	1 1/2	-	0.0
A-PIES	APLES	1- 2	1 1/8	- 1/8	-10.0
A	AUTOMATIC DATA PROC	44- 0	57 5/8	-1 1/8	-1.8
O	AUTO SCIENCES	5- 8	8 1/8	- 1/4	-3.9
O	BOOTHE DATA SYS	1- 2	1 3/8	0	0.0
O	BRANSON APPLIED SYS	1- 1	3/4	- 1/8	-14.2
O	COMPUTER AGE INDUS.	1- 2	5/8	0	0.0
O	COMPUTER ENVIRON	1- 2	1	- 1/8	-11.1
O	COMPUTER INDUS.	4- 5	5	0	0.0
O	COMPUTER NETWORK	3- 10	8 1/2	- 1/2	-5.5
O	COMPUTER PROPERTY	8- 11	0	- 1/4	-2.7
O	COMPUTER SCIENCES	9- 12	10 1/4	+1 1/4	+13.3
O	COMPUTER TASK GROUP	1- 2	1 3/4	+ 1/4	+16.0
O	COMPUTER USAGE	5- 10	7 3/4	+ 1/4	+3.3
O	COMP AUTHORIZ REPORTS	8- 13	11 1/2	- 3/8	-3.1
O	COMPUTING & SOFTWARE	24- 50	32 1/8	-1 7/8	-5.9
O	COMRESS	2- 4	3 7/8	+ 1/4	+8.8
O	CONSHARE	4- 8	8 3/4	+ 1/8	+1.8
O	CONSOL. ANAL. CENT.	2- 7	2	+ 1/4	+14.2
O	DATA AUTOMATION	1- 4	2 1/2	0	0.0
O	DATA PACKAGING	7- 10	8 1/8	+ 1/4	+3.9
O	DATAMATION SERVICE	1- 5	1 1/8	- 1/8	-10.0
L	DATATAR	4- 10	10	+ 1/4	+2.5
O	DIDIER	1- 3	2 3/8	+ 3/8	+15.8
O	EMP RESOURCES	7- 10	1/4	- 1/2	-5.4
N	ELECT COMP PROD	7- 10	7 3/8	- 1/8	-1.7
M	ELECTRONIC DATA SYS.	83- 85	62 1/4	-5 3/4	-5.6
O	INFORMATICS	7- 15	13 3/4	- 3/4	-5.1
A	ITEL	15- 25	17 3/8	-1 7/8	-9.7
O	KEANE ASSOCIATES	8- 15	9 1/4	- 1/4	-2.6
O	KEYDATA CORP	10- 14	11 1/4	0	0.0
A	MANAGEMENT DATA	11- 21	10 1/4	+1 1/4	+13.1
O	NATIONAL CSS INC	7- 14	12 1/2	+ 1/4	+2.0
A	NAT COMP ANALYSTS	4- 6	5 3/4	+ 1/4	+4.5
O	NAT.COMP. SERV.	2- 3	3 5/8	+1 5/8	+81.2
N	PLANNING RESEARCH	16- 26	19 1/4	-1 7/8	-8.8
N	PROGRAMMING METHODS	25- 29	27 1/2	- 1/4	-0.9
O	PROGRAMMING & SYS	2- 4	2 1/2	- 1/4	-9.0
O	PROGRAMMING SCIENCES	1- 1	1/2	0	0.0
O	SCIENTIFIC RESOURCES	1- 2	3/4	- 1/8	-14.2
O	SOFTWARE SYSTEMS	1- 2	1 3/8	0	0.0
O	TDS COMPUTER CENTERS	5- 9	1/2	- 1/8	-2.2
O	TOLLEY INTL CORP	5- 8	0 5/8	+ 1/4	+3.0
O	UNITED DATA CENTER	2- 3	2	+ 1/4	+14.2
N	UNIVERSITY COMPUTING	21- 33	33 1/8	+2 1/8	+6.7
A	URS SYSTEMS	7- 11	7 5/8	- 1/4	-3.2
O	U.S. TIME SHARING	1- 3	2 1/8	- 1/8	-5.5
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	24- 42	41 3/4	+ 1/4	+0.6
O	ALPHANUMERIC	5- 0	3 3/4	0	0.0
A	AMPEX CORP	15- 25	23 3/4	+ 3/4	+3.2
O	ASTRODATA	1- 2	1 3/8	- 1/8	-7.1
O	ATLANTIC TECHNOLOGY	5- 8	8 3/8	-1 5/8	-17.7
A	BOLT,BERANEK & NEW	5- 7	6	- 1/4	-4.0
N	BUNKER-RAMO	10- 17	15 1/8	- 1/2	-3.1
A	CALCOMP	25- 33	28 1/8	- 7/8	-3.0
O	CONRTRONICS	5- 9	7 1/2	- 1/8	-1.5
O	COLORADO INSTRUMENTS	4- 8	4 1/8	- 1/8	-2.8
O	COMPUTER COMMUN.	8- 19	12 1/8	- 1/8	-4.9
A	COMPUTER EQUIPMENT	4- 7	0 1/4	- 5/8	-9.0
A	COMPUTEST	13- 20	14 3/8	+ 1/4	+1.7
O	CONSOL COMPUTER LTD.	6- 11	11	-	0.0
A	DATA PRODUCTS CORP	6- 10	7 3/4	- 1/8	-1.5
A	DATA TECHNOLOGY	5- 9	7 1/2	- 1/8	-1.6
O	DIGITRONICS	4- 8	5 3/8	- 1/8	-2.3
N	ELECTRONIC M & M	10- 18	15 1/8	+1 1/8	+15.0
O	FABRI-TEK	2- 4	3 7/8	- 1/4	-6.8
O	FARRINGTON MFG	1- 5	1 1/4	- 1/4	-16.6
O	FITO-NEW INC	5- 6	5 1/2	- 1/4	-15.3
O	INFOREX INC	31- 48	39 1/2	-1	-2.0
O	INFORMATION DISPLAYS	1- 1	1/2	0	0.0
O	MANAGEMENT ASSIST	1- 2	3/4	- 1/8	-12.5
A	MARSHALL INDUSTRIES	18- 27	22 7/8	- 7/8	-3.8
A	MILGO ELECTRONICS	18- 28	19 5/8	-2 5/8	-11.9
N	MOHAWK DATA SCI	25- 47	42 1/2	0	0.0
O	ON LINE SYSTEMS INC	7- 18	15	- 1/2	-3.2
O	OPTICAL SCANNING	1- 3	2 3/4	+1	+57.2
O	PHOTON	7- 12	9 1/4	- 1/4	-2.6
O	PHOTO-MAGNETIC SYS.	1- 5	3 1/2	+1 1/2	+350.0
A	POTTER INSTRUMENT	17- 25	21	- 1/4	-1.2
O	PRECISION INST.	7- 14	9 1/2	- 1/2	-5.0
O	RECOGNITION EQUIP	15- 30	27 1/8	- 5/8	-2.6
O	REOCOR CORP	5- 9	7	0	0.0
O	SANDERS ASSOCIATES	15- 22	20 3/8	- 7/8	-4.1
O	SCAN DATA	8- 11	6 3/4	0	0.0
O	TALLY CORP.	11- 20	11 3/4	- 1/2	-4.0
O	TELEX	22- 51	11 1/8	- 1/2	-4.3
O	VIATRON	1- 4	7/8	0	0.0
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	14- 19	15 3/4	+ 1/4	+1.6
O	BALTIMORE BUS FORMS	8- 10	8 3/4	- 1/4	-2.7
A	BARRY WRIGHT	5- 13	9	- 1/8	-1.6
A	DATA DOCUMENTS	18- 29	24 1/8	- 3/4	-3.0
O	DUPLEX PRODUCTS INC	6- 10	8 1/2	- 1/4	-2.8
N	ENNIS BUS. FORMS	10- 13	10 7/8	- 1/2	-4.3
O	GRAHAM MAGNETICS	9- 33	27 1/4	-1 5/8	-5.6
O	GRAPHIC CONTROLS	6- 13	11 1/4	- 1/4	-2.2
N	MEMOREX	54- 78	58 1/2	-2 3/8	-4.0

E X C H		------PRICE------ 1971 HIGH	CLOSE BID	WEEK NET CHNGE	WEEK PCT CHNGE
N	3M COMPANY	80- 117	113 1/4	- 1/2	-0.4
O	MOORE BUS. FORMS	37- 49	37 3/8	- 1/2	-1.3
N	NASHUA CORP	20- 45	44 1/2	0	0.0
O	REYNOLDS & REYNOLD	37- 52	47	+2 1/2	+5.6
O	STANDARD REGISTER	15- 23	20 3/4	- 1/2	-2.3
O	TAB PRODUCTS CO	8- 15	14 3/8	-1	-0.3
M	UARCO	25- 33	31 3/4	- 7/8	-2.6
A	MARASH MAGNETICS	8- 10	8 1/8	0	0.0
N	WALLACE BUS FORMS	18- 20	21	- 5/8	-2.8
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	105-138	133 1/4	-2 1/2	-1.8
N	COLLINS RADIO	14- 20	18 5/8	+ 3/8	+2.0
N	CONTROL DATA CORP	46- 83	83 3/4	-1 1/4	-4.4
O	DATA GENERAL CORP	19- 45	41 7/8	-1 1/8	-2.6
N	DIGITAL EQUIPMENT	55- 83	82	+2 1/2	+3.1
N	ELECTRONIC ASSOC.	5- 9	9	+ 1/4	+2.8
A	ELECTRONIC ENGINEER.	1- 6	8 1/2	- 1/8	-1.4
N	FOXBORO	25- 42	42 1/4	+ 3/4	+1.8
O	GENERAL AUTOMATION	12- 20	19 3/4	+ 1/4	+1.2
N	GENERAL ELECTRIC	94-124	121 3/4	+1 1/4	+1.0
N	HEWLETT-PACKARD CO	30- 49	34 5/8	+ 1/8	+0.3
N	HONEYWELL INC	85-115	111	+3 1/8	+2.8
N	IBM	310-364	340 1/4	-11 1/2	-3.2
O	INTEGRATA INC	0- 11	6 7/8	- 5/8	-5.8
N	NCR	58- 87	83	- 1/2	-0.6
N	RCA	26- 40	38 1/2	- 1/8	-0.3
N	RAYTHEON CO	27- 46	42 3/4	-1 1/2	-3.4
O	SCI. CONTROL CORP.	1- 2	1 1/8	0	0.0
N	SPERRY RAND	25- 38	30 1/2	+2 1/4	+8.5
A	SYSTEMS ENG. LABS	13- 18	13 7/8	-1 1/4	-11.4
N	VARIAN ASSOCIATES	15- 18	15 1/2	- 1/2	-3.1
N	VICTOR COMPTOMETER	17- 27	20 1/4	+ 1/4	+10.0
N	WANG LABS.	25- 50	49 3/4	+1 1/2	+3.1
N	XEROX CORP	48- 71	70	-1	-0.6
	LEASING COMPANIES				
A	BOOTHE COMPUTER	15- 27	25	-	-4.1
O	BRESNAHAN COMP.	2- 4	3	+ 1/4	+8.0
O	COMPUTER EXCHANGE	4- 8	5 5/8	+ 1/8	+2.2
A	COMPUTER INVSTRS GRP	8- 14	12 5/8	0	0.0
O	DATA PROC. F & G	11- 17	17	+ 1/8	+0.7
O	DATRONIC RENTAL	2- 4	2 7/8	+ 1/4	+8.0
A	OEARBORN-STORM	24- 44	40 1/8	+1	+2.5
A	DIEBOLD COMP. LEAS.	5- 13	11 1/2	- 1/4	-2.1
A	OPCA INTL	5- 8	7 3/4	- 1/4	-3.1
A	ORANITE HOT	8- 13	9 5/8	+1 1/4	+13.4
A	GREYHOUND COMPUTER	7- 11	10 1/2	+ 1/4	+2.4
N	LEASCO CORP	16- 23	21 3/4	+ 5/8	+2.9
O	LECTRO HOT INC	2- 4	3 1/2	- 3/8	-8.6
A	LEVIN-TOWNSEND CMP	5- 8	7 1/2	0	0.0
O	LMC DATA, INC.	1- 1	7/8	0	0.0
O	MCC INDUSTRIES	1- 2	0 5/8	+ 1/0	+1.7
O	SYSTEMS CAPITAL	3- 6	5 1/4	+1 1/8	+27.7
N	U.S. LEASING	16- 25	25	+ 5/0	+1.5

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index

Computer Systems — Software & EDP Services
Peripherals & Subsystems — Leasing Companies
Supplies & Accessories — CW Composite Index



Earnings Reports

VARIAN ASSOCIATES
Six Months Ended April 2

	1971	1970
Shr Emd	.....	$.41
Revenue	$90,886,000	95,559,000
Earnings	a2,686,000	.....
Earnings (Loss)	(7,582,000)	2,626,000

a-Consists of $786,000 charge to conform the accounting methods of affiliated companies, representing certain costs incurred by these affiliates in prior years, and a $1.7 million charge for relocation of facilities.

DATATAB
Three Months Ended March 31

	1971	1970
Shr Emd	8.08	8.03
Revenue	1,011,746	927,455
Earnings	43,049	27,006

COMPUTER INSTRUMENTS
Four Months Ended April 23

	1971	1970
Revenue	$1,346,746	$1,757,716
Loss	22,808	56,648

COMPUTER USAGE
Three Months Ended March 31

	1971	1970
Shr Emd	$.09	$.11
Revenue	1,089,836	$1,428,320
Earnings	47,401	(582,813)
6 Mo Shr	.27	.03
6 Mo Revenue	2,129,077	3,295,031
Earnings (Loss)	$7,770	(1,071,019)

SPERRY RAND CORP.
Year Ended March 31

	1971 (000)	1970 (000)
Shr Erned	$2.11	$2.37
Revenue	1,739,381	1,755,443
Earnings	72,268	81,014
3 Mo Shr	.50	.71
Revenue	466,024	508,983
Earnings	20,643	24,281

ELECTRONIC ENGINEERING
Three Months Ended March 31

	1971	1970
aShr Erned	.....	.....
(Loss)	$.01	$(.05)
Revenue	1,652,000	2,303,000
Spec Chg	26,000	.....
Loss	26,000	29,000

a-Based on income before special charge.

DIEBOLD COMPUTER LEASING
Three Months Ended March 31

	1971	1970
aShr Erned	8.16	8.09
Revenue	8,507,000	8,159,000
Earnings	708,000	382,000

a-On a fully diluted basis.

GREYHOUND COMPUTER
Three Months Ended March 31

	1971	1970
Shr Erned	8.22	5.20
Revenue	11,907,000	12,383,000
Earnings	938,000	a534,000

DIAGNOSTIC DATA
Year Ended Feb. 28

	1971	a1970
Shr Erned	8.01	.....
Revenue	389,521	.....
Earnings	b134,258	.....

a-Comparable figures not available; company was in developmental stage prior to March 1, 1970. b-After amortization of $53,000 in deferred pre-operating and product acquisition costs and an accounting allocation of $9,900 in income taxes which will eventually be applied against loss carryforward.

MILGO ELECTRONIC CORP.
Three Months Ended March 31

	1971	1970
Shr Erned	.....	$5.32
Revenue	$1,918,000	3,767,000
Tax Cred	.....	107,000
Earnings (Loss)	(149,000)	b590,000
Revenue	3,893,000	6,772,000
Tax Cred	.....	440,000
Earnings (Loss)	(233,000)	b1,224,000

a-Based on income before tax credit. b-Equal to $.98 per share in the quarter and 81 cents a share in the six months.

VICTOR COMPTOMETER
Three Months Ended March 31

	1971	1970
Shr Erned	5.06	$5.19
Revenue	38,829,068	29,829,907
Earnings	404,692	a1,000,974

a-Restated to retroactively reflect the writeoff of computer division start-up costs as incurred.

COMPUTER DYNAMICS
Three Months Ended March 31

	1971	1970
Revenue	$379,300	$263,300
Earnings (Loss)	16,000	(39,000)

The canister melted; the flanges buckled. The tape came through.

It's Epoch 4.

This was no white-coat lab test—it was a genuine, hook-and-ladder, water-hoses-everywhere-type fire.

When things cooled down, the Graham Magnetics labs found four reels of Epoch 4, with the canisters melted together, and the flanges all heat distorted. The flanges were removed, and the tapes were played on CDC certifiers at a 45% clipping level, at 800 bpi.

Here's how Epoch 4 came through:

Tape #1: no permanent errors; no temporary errors.

Tape #2: one permanent error; three temporary errors.

Tape #3: no permanent errors; one temporary error.

Tape #4: four permanent errors; three temporary errors.

So maybe you don't plan on having a fire.

Nobody does. But even if your tapes never get hotter than a frozen daiquiri, you'll be safer with Epoch 4. Here's why:

Epoch 4 came through the fire because of its physical toughness. The tape withstood the tremendous pressures generated by rapid expansion and contraction, as well as the direct heat.

This same physical toughness is what makes Epoch 4 last so much longer than conventional tapes in normal usage. Because Epoch 4 is 8000% tougher than competitive tapes, it shrugs off the careless handling that causes most damage to computer tape. And because of this toughness, Epoch 4 withstands the stresses imposed by long-term shelf storage.

In fact, Epoch 4 is so tough, we guarantee it for twenty years.

Think it over. Maybe you'll never have a fire. But handling damage and storage stresses will always be around.

Your data deserves the extra protection of the toughest tape in the business.

Your data deserves Epoch 4.

GRAHAM MAGNETICS

GRAHAM, TEXAS 76046